Shell Lubricants

Shell LubeAnalyst

USER GUIDE

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Please note that the assessment of lubricant condition is a complex task. Shell and its related bodies corporate have prepared this document as a guide only, to assist you in using the Shell LubeAnalyst service. It should not be regarded as authoritative for all machinery, in all circumstances. If in doubt about a particular aspect of testing, contact the equipment manufacturer or your local Shell representative.

LubeAnalyst Users should ensure they have read in full the Shell LubeAnalyst User Manual and related documents available at www.shell.com.au/lubeanalyst. Neither Shell nor its related bodies corporate shall be liable for any loss, damage, costs and expenses (including loss of profits, business or anticipated savings or any direct or consequential losses of whatever kind), whether caused by negligence or otherwise, incurred by customers or any other person or entity arising in connection with use of or reliance on the LubeAnalyst service. In the case of non-excludable guarantees, warranties or conditions applied by law, Shell's liability is limited (at Shell's option) to the replacement or resupply of the relevant goods/services (or payment of the cost thereof), where this is permitted by law.

2 Introduction

Welcome to Shell LubeAnalyst, Shell's leading oil and equipment condition monitoring service. Shell LubeAnalyst is a powerful online global database that leverages our technical expertise in lubricants and lubrication.

Shell LubeAnalyst is like a health check for your oil and equipment. It is a condition monitoring service which helps to keep your equipment running smoothly.

How can Shell LubeAnalyst help me improve equipment reliability and save money on maintenance?

The Shell LubeAnalyst service has been designed as an early warning system that identifies signs of increased wear and evidence of unwanted contaminants or lubricant degradation. This condition monitoring service helps to provide preventive and predictive maintenance.

Lubricants are designed to perform many functions, such as to reduce friction and wear, transfer power, and remove and control contaminants. The physical and chemical analysis of used lubricants can reveal important information about the condition of machinery and the ongoing serviceability of the lubricant. In many applications, an aged lubricant can begin to cause damage to machinery rather than protect it. Whether this is due to excessive contamination or chemical degradation, oil analysis can be an effective means of detecting this common problem and optimising service intervals.

Oil analysis is also one of the most effective ways of trending wear and identifying wear behaviour, whether this is via time based trending of wear, or the morphological study of individual wear particles.

There are five simple steps to the Shell LubeAnalyst equipment condition monitoring service:

1. Register your customer details and equipment with Shell LubeAnalyst
2. Collect the oil sample
3. Label the oil sample
4. Mail the oil sample
5. Receive the lab report with diagnosis and recommendations.

How do I get the most out of Shell LubeAnalyst?

Define your goals clearly, so that the tests performed are appropriate for the application. Complete the sample registration process to determine true conditions and help ensure accurate testing.

The Shell LubeAnalyst system is a powerful database. **Figure 1** shows the hierarchy of the database and illustrates the relationship between each level. There is no limit to the number of elements that can be registered to each level.

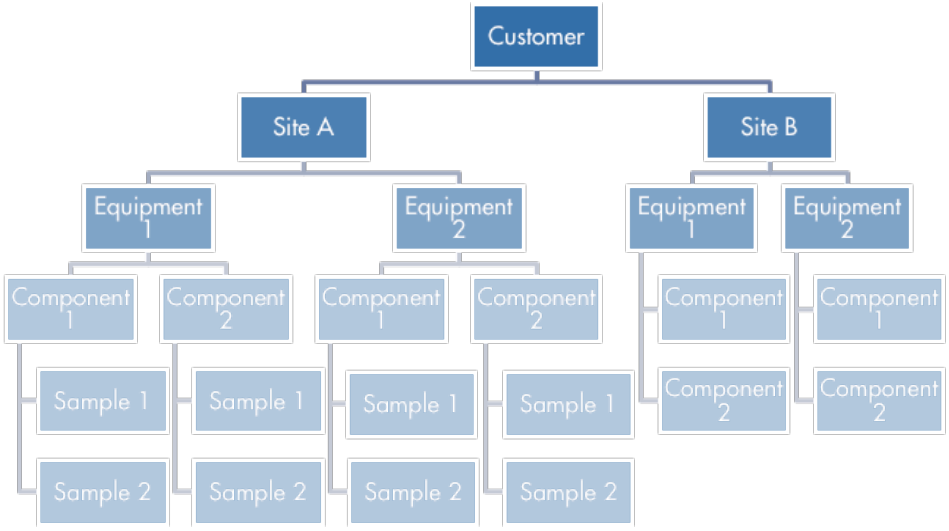


Figure 1 Shell LubeAnalyst Database Hierarchy

Subscribers

A subscriber to the Shell LubeAnalyst system may be linked to any of these levels. A subscriber is the person who will receive all the Shell LubeAnalyst sample reports for the equipment or components at or below the level to which they are registered. The subscriber can select to receive all reports for samples processed, or choose to receive only certain reports (for example, with the status "Action"). There is no limit to the number of subscribers that can be linked to a level. The component level is the lowest level to which a subscriber can be linked. Subscribers can be removed or added at anytime.

3 Registering as a new Shell LubeAnalyst Customer

Current Shell Customer

If you have an account with Shell, please contact your Shell Account Manager, Shell Lubricants Technical Advisor or the Shell Technical Helpdesk on 1300 134 205.

We will need the following information for your LubeAnalyst registration:

- Shell Customer "Sold to" number
- Site name – Shell "Ship to" number
- Invoice Address
- Contact Name
- Contact Phone
- Contact Email address

Current Shell Distributor Customer

For customers that purchase Shell LubeAnalyst kits through our network of Shell Lubricants distributors and re-sellers, please contact the Shell Technical Helpdesk for assistance in setting up your access.

You'll need to provide us with the following information for registration:

- Company Name
- Company Address
- Contact Name
- Contact Phone
- Contact Email

Once you have been registered as a Shell LubeAnalyst Customer, you will receive a **Welcome to Shell LubeAnalyst** email. This message will include your User ID and password, together with the Shell LubeAnalyst database web address, to enable you to login to and begin your Shell LubeAnalyst oil condition monitoring program.

4 Registering a New Shell LubeAnalyst Site

Now that you have your login details, you will be able to register your site(s) with Shell LubeAnalyst. First you will need to log in to the Shell LubeAnalyst database and enter your User ID and password. You can also reach the login screen by clicking on the web address in your **Welcome to Shell LubeAnalyst** email.

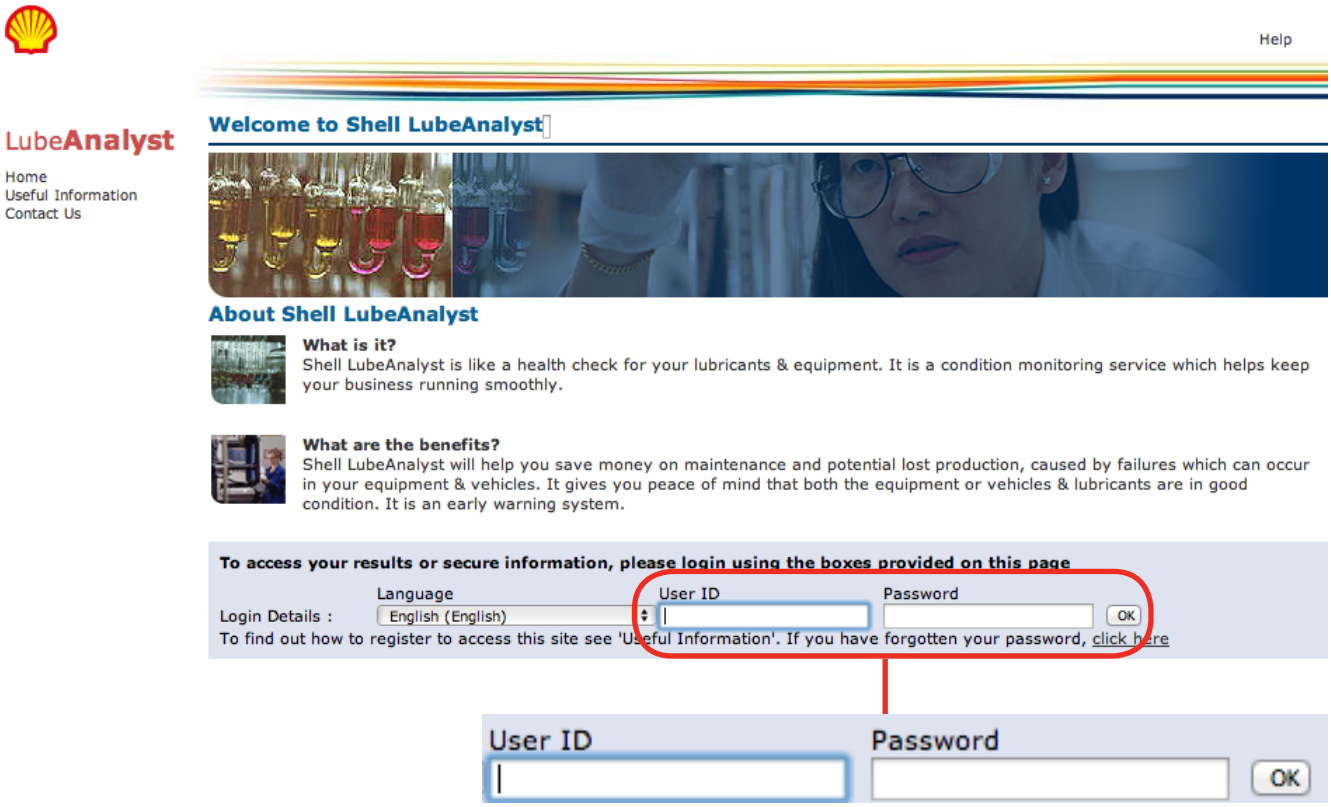


Figure 2 Login Screen

You will be automatically directed to the **Sample Results** page, the home page. You will see any new results since your last login.

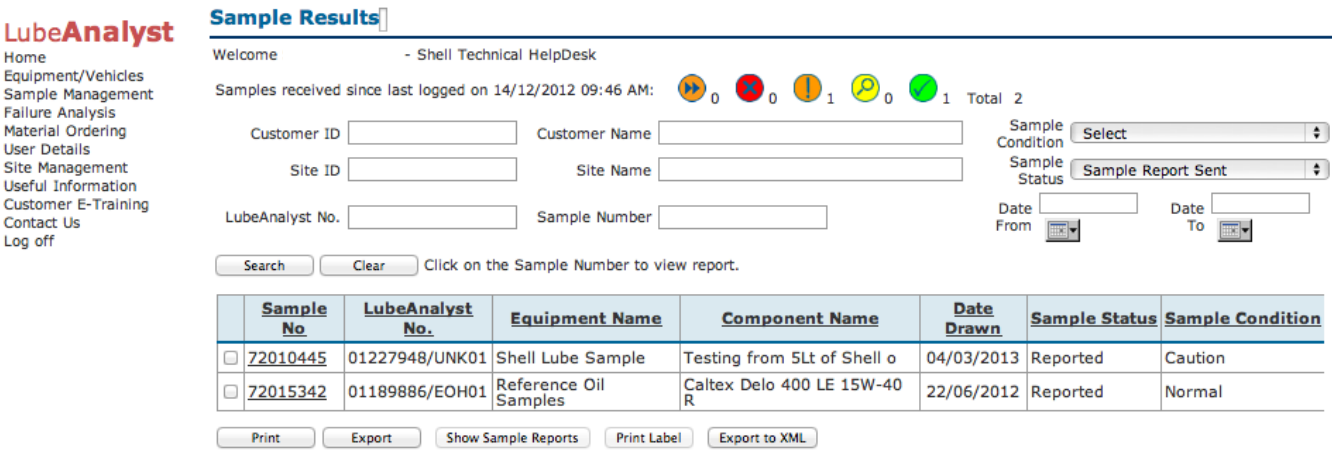


Figure 3 Sample Results Page

Now you can register your new site. Choose **Site Management**, then **Register**, from the LubeAnalyst menu, and complete all the required fields. Required fields in LubeAnalyst are marked with an asterisk (*), they are highlighted below with a ✱. Once you're satisfied with the details, click Submit Form.

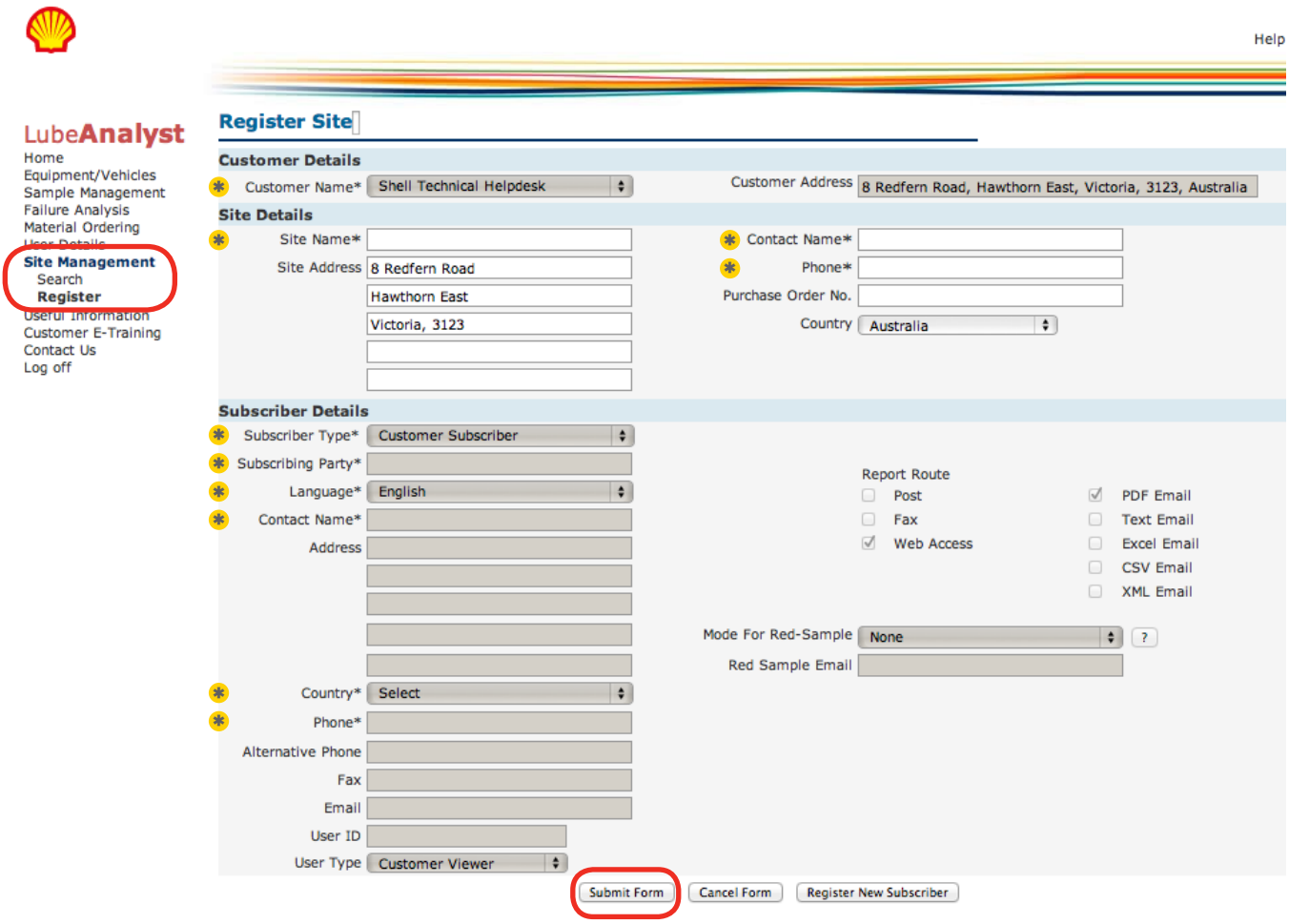


Figure 4 Site Registration

You'll see a green message indicating your **Site details saved successfully** and you'll receive a confirmation email from Shell LubeAnalyst. You are now ready to register your new site's equipment.

5 Registering new Equipment or Vehicles

With your site details completed, you can begin registering equipment. Choose **Equipment/Vehicles**, then **Register** from the LubeAnalyst menu. Select the site from the Site Name field. Complete the remaining fields, those fields marked with an asterisk (*) are compulsory, they are highlighted below with ✱. You can use the Add button to add new data.

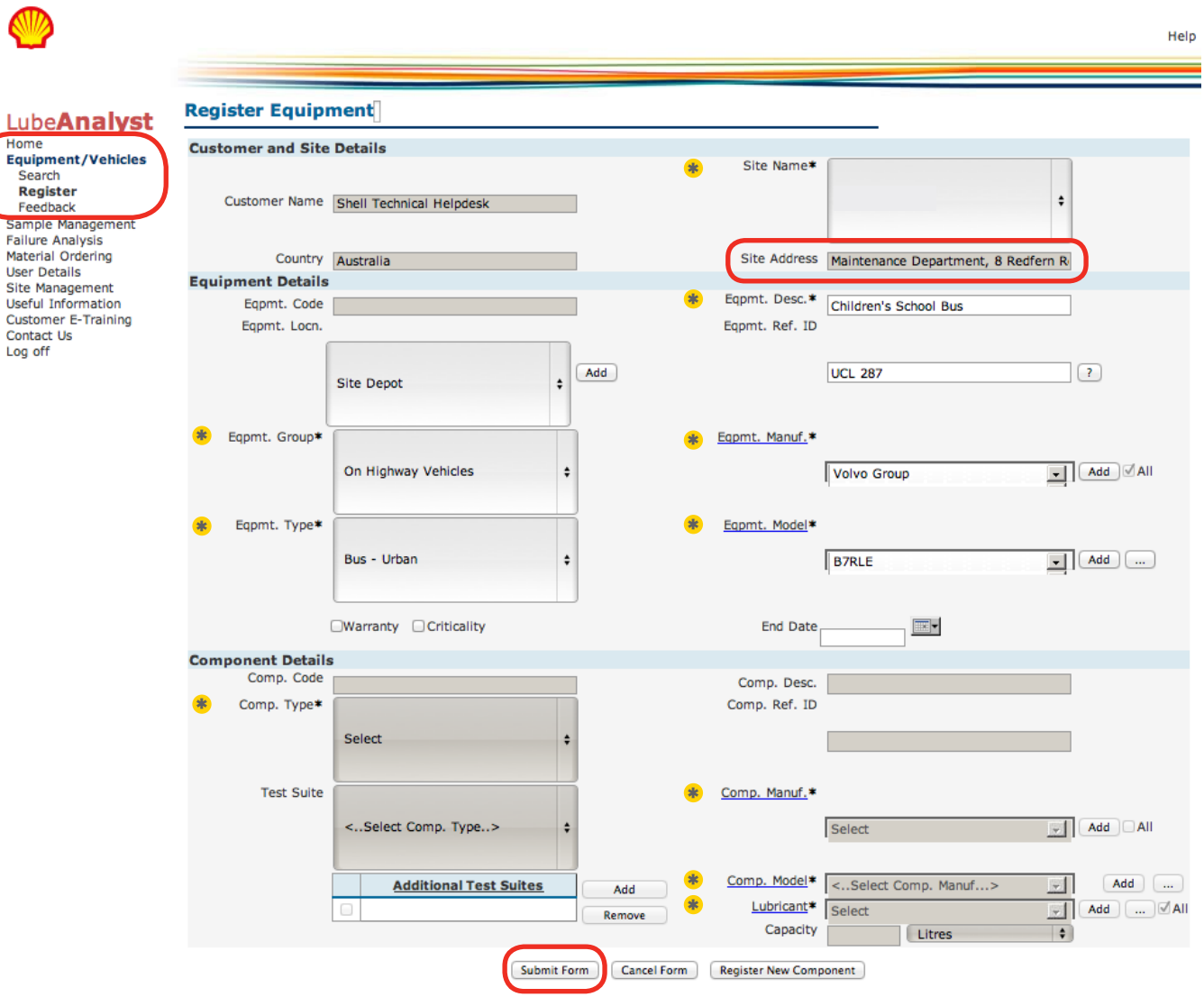


Figure 5 Register Eqiupment

Once all details have been completed, click Submit Form to save the new equipment. A message will appear in green confirming **Equipment details saved successfully**. Now you can register the components of the equipment by clicking the Register New Component button.

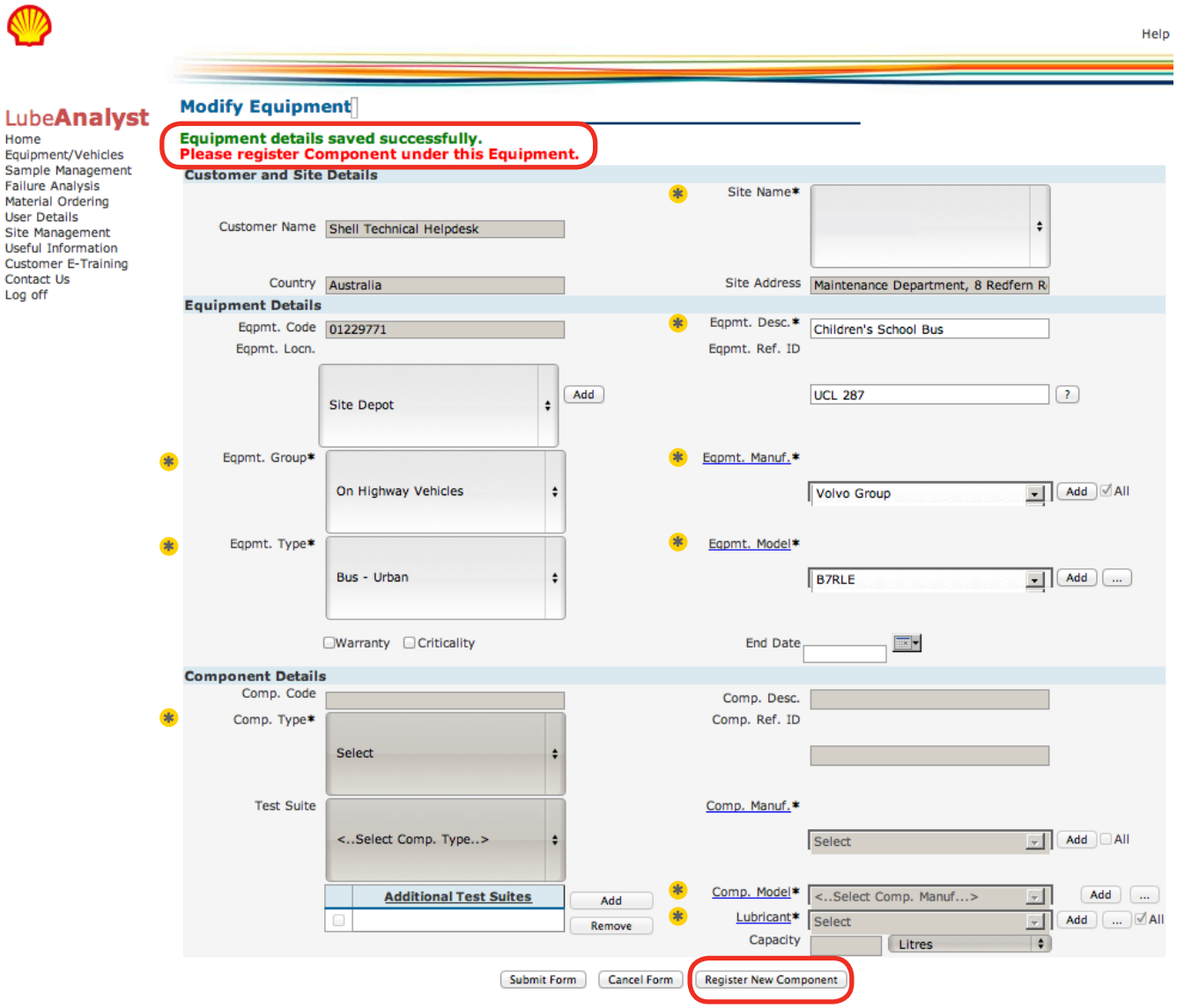


Figure 6 Modify Equipment – Register

6 Registering a new Shell LubeAnalyst Component

A component must be registered to a piece of equipment as illustrated in the hierachy depicted in **Figure 1**. Select **Equipment/Vehicles**, then **Search** in the LubeAnalyst menu (or if you have just successfully registered a new piece of equipment, click Register New Component . In the search screen you can choose filters required and select Search, which will return a list of equipment registered to your site. Select the correct equipment. This will take you to the view **Equipment/Vehicle** screen. Then select Register New Component button.

Complete the data fields, those marked with an asterisk (*) are compulsory, highlighted below with ✱. You can use the Add button to add new data. To help select the test suite required for this Component, please refer to Section 9.0 Choosing a Shell LubeAnalyst Test Kit/Suite. The Test Suite you choose for this component must match the kit type that you have purchased. For example, if you select a K2 test suite, you must send the sample with a K2 label.

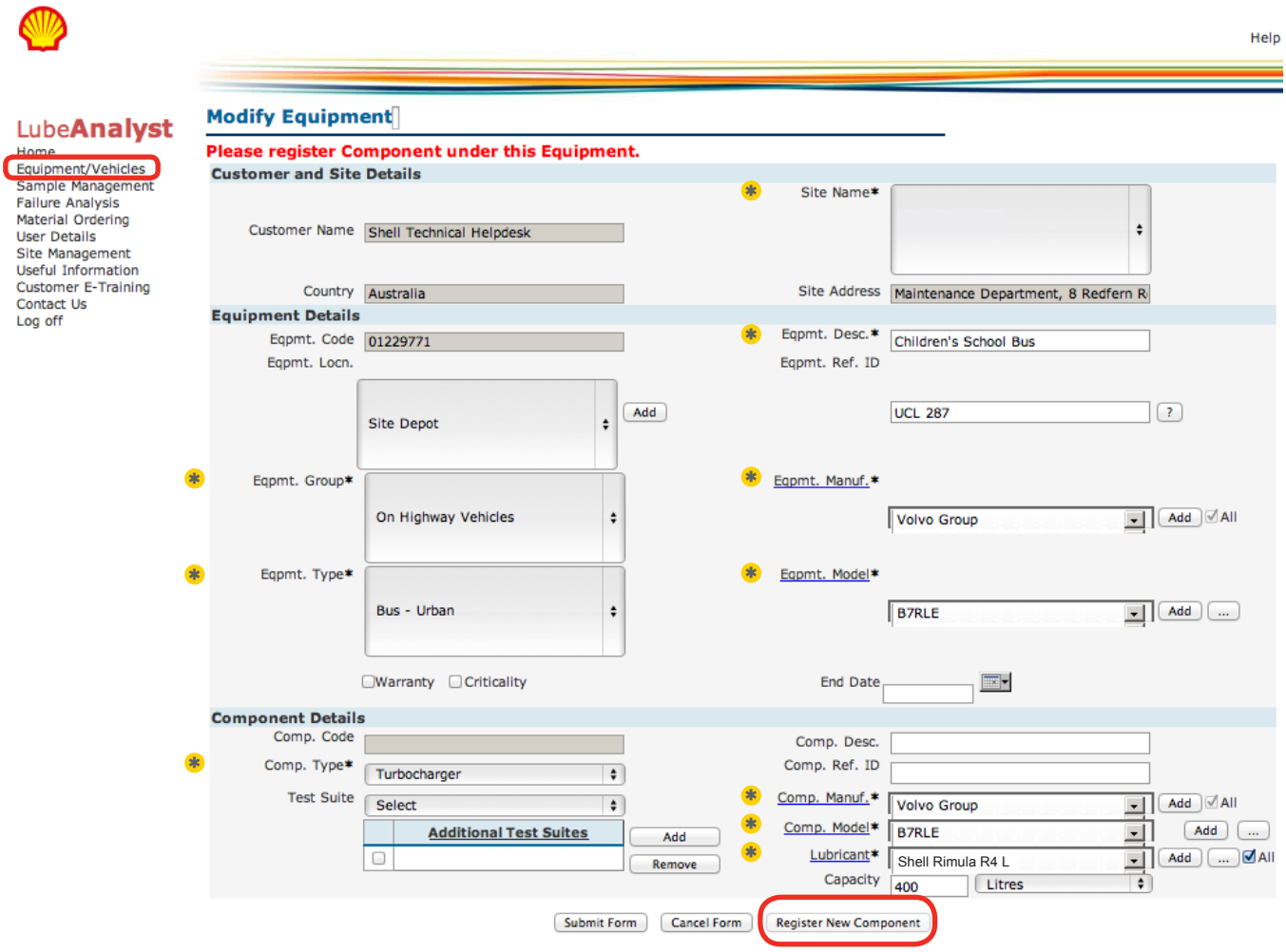


Figure 7 Modify Equipment – Component Details

Additional tests can also be added to the test suite, at additional cost. Please contact the Shell Technical Helpdesk on 1300 134 205 prior to selecting additional test suites. Once all details have been completed, click the Submit Form button to save these details.

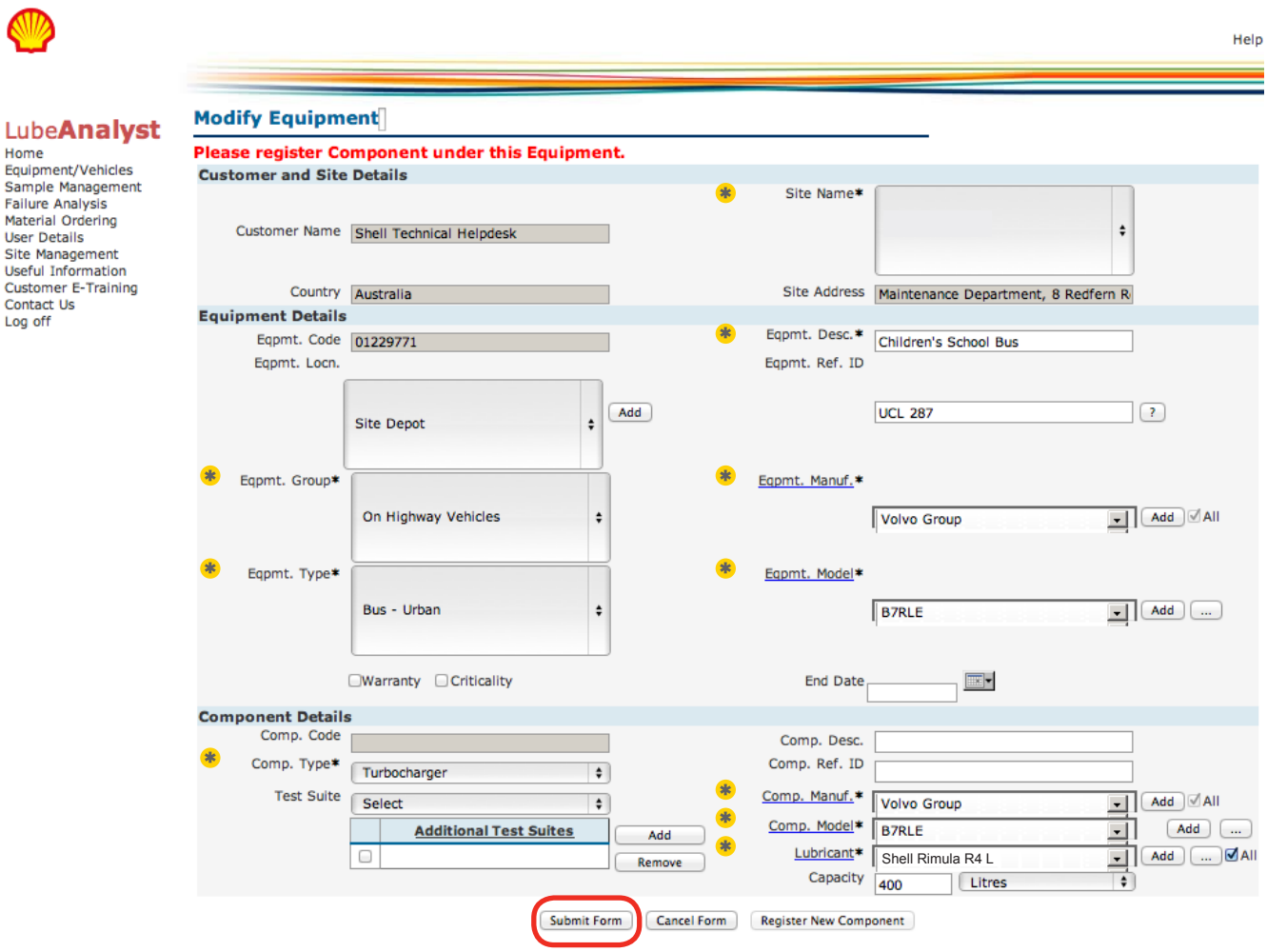
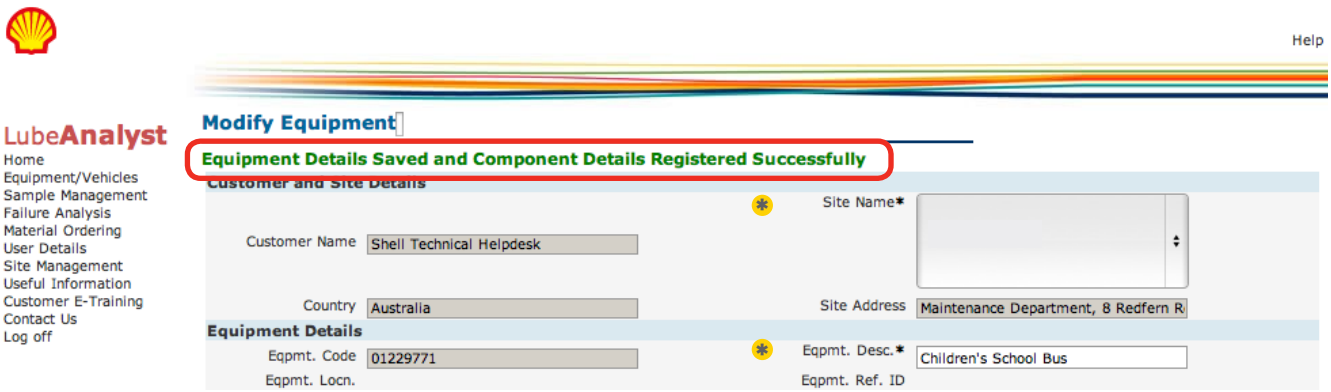


Figure 8 Modify Equipment – Details Saved

A green message will appear **Equipment Details Saved and Component Details Registered Successfully**.



7 Registering a new Shell LubeAnalyst Subscriber

Subscribers to the Shell LubeAnalyst system are the people who will receive the LubeAnalyst reports. Subscribers can be registered at any level of the hierarchy, customer, site, equipment or component. For example, a subscriber registered at the customer level will receive reports for all sites, and a subscriber registered to a piece of equipment will receive reports for that piece of equipment and related components only.

You can add a subscriber using the Shell LubeAnalyst website, allowing the subscriber to receive analysis reports via email as they are generated from the LubeAnalyst system. There are three active user settings for registering a subscriber: Customer Viewer, Customer User and Customer Admin. See **Table 1** for details.

Access Level	View Data and Reports	Register Equipment/ Component	Register Subscriber at Site Level	Register Subscriber at Equipment/ Component level
Customer Viewer	■			
Customer User	■	■	■	
Customer Admin	■	■	■	■

Table 1 Customer access levels

7.1 Registering a subscriber at site level

Once logged on, select **User Details**, then **Register** from the Lube Analyst menu.

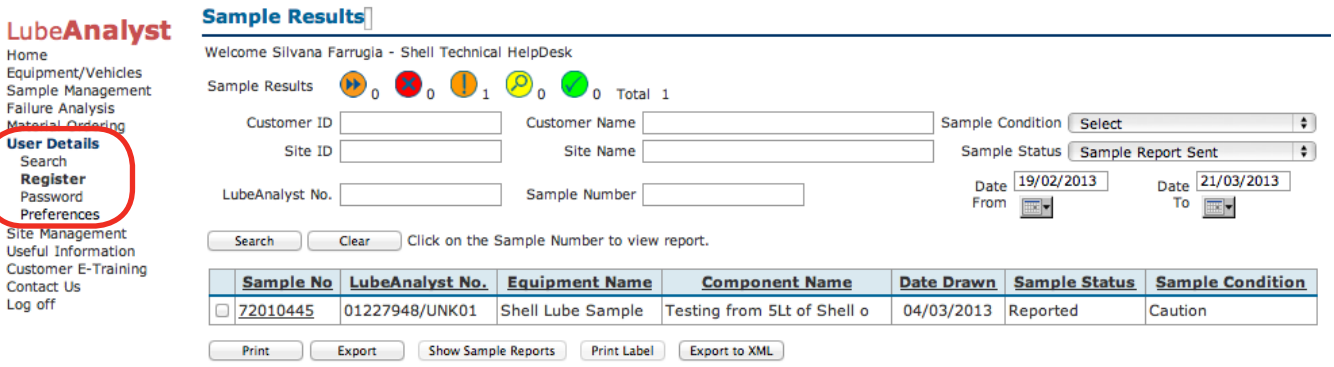


Figure 9 Sample Results

Select the site you wish to register from the Site Name drop down box located under the Site Details section. Once selected, enter details under the Subscriber Details section. Note that **Mode For Red-Sample** (**Figure 10**) should be set to **None** unless the subscriber would like all Action (Red) sample reports to be sent to additional persons.

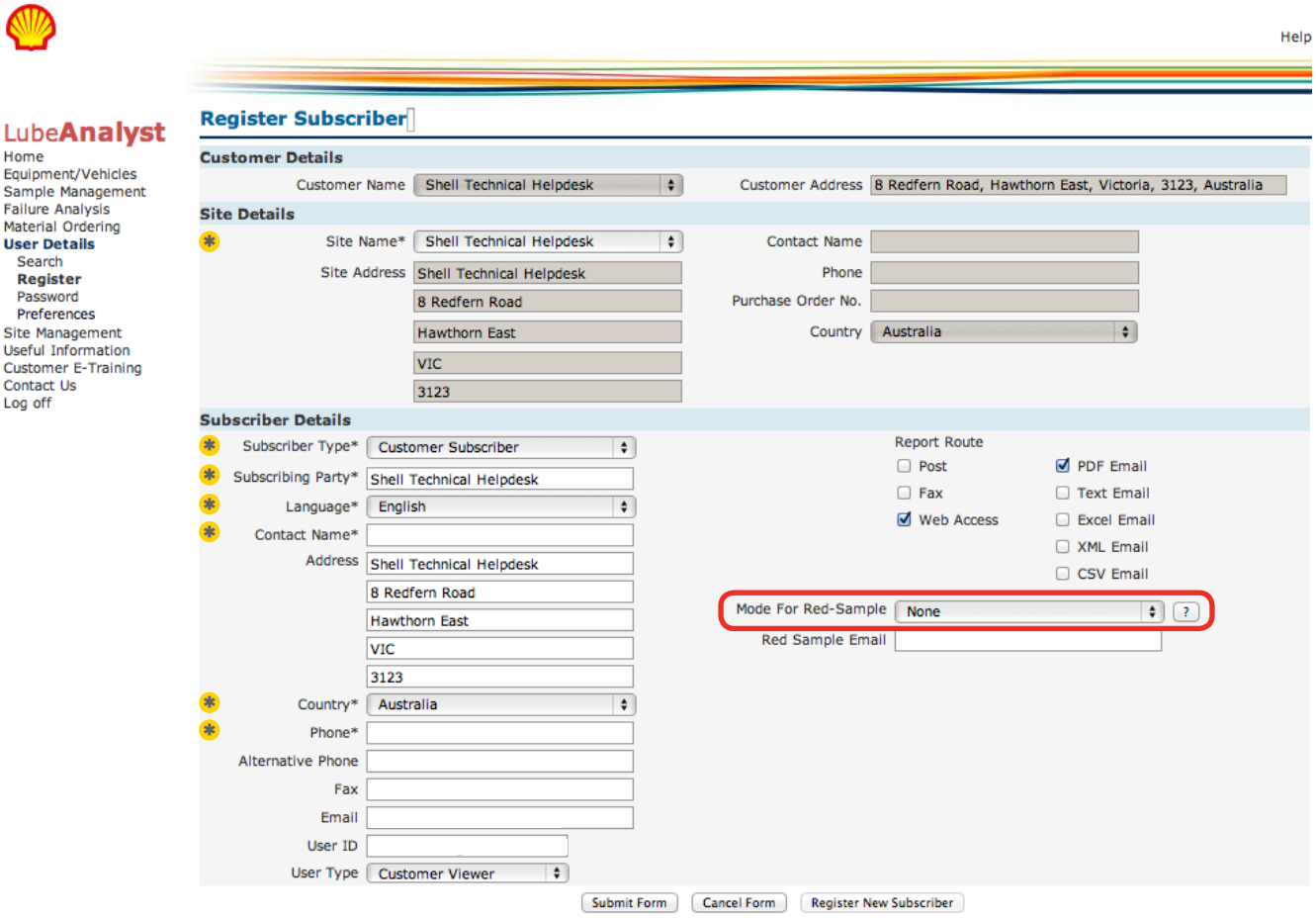


Figure 10 Register Subscriber

Once you have completed all the new subscribers' details, click the Submit Form button. A green message will appear confirming **Subscriber details registered successfully**. The entry will then be validated by the LubeAnalyst administrator, and a welcome email will be sent to the subscriber, containing login and password details.

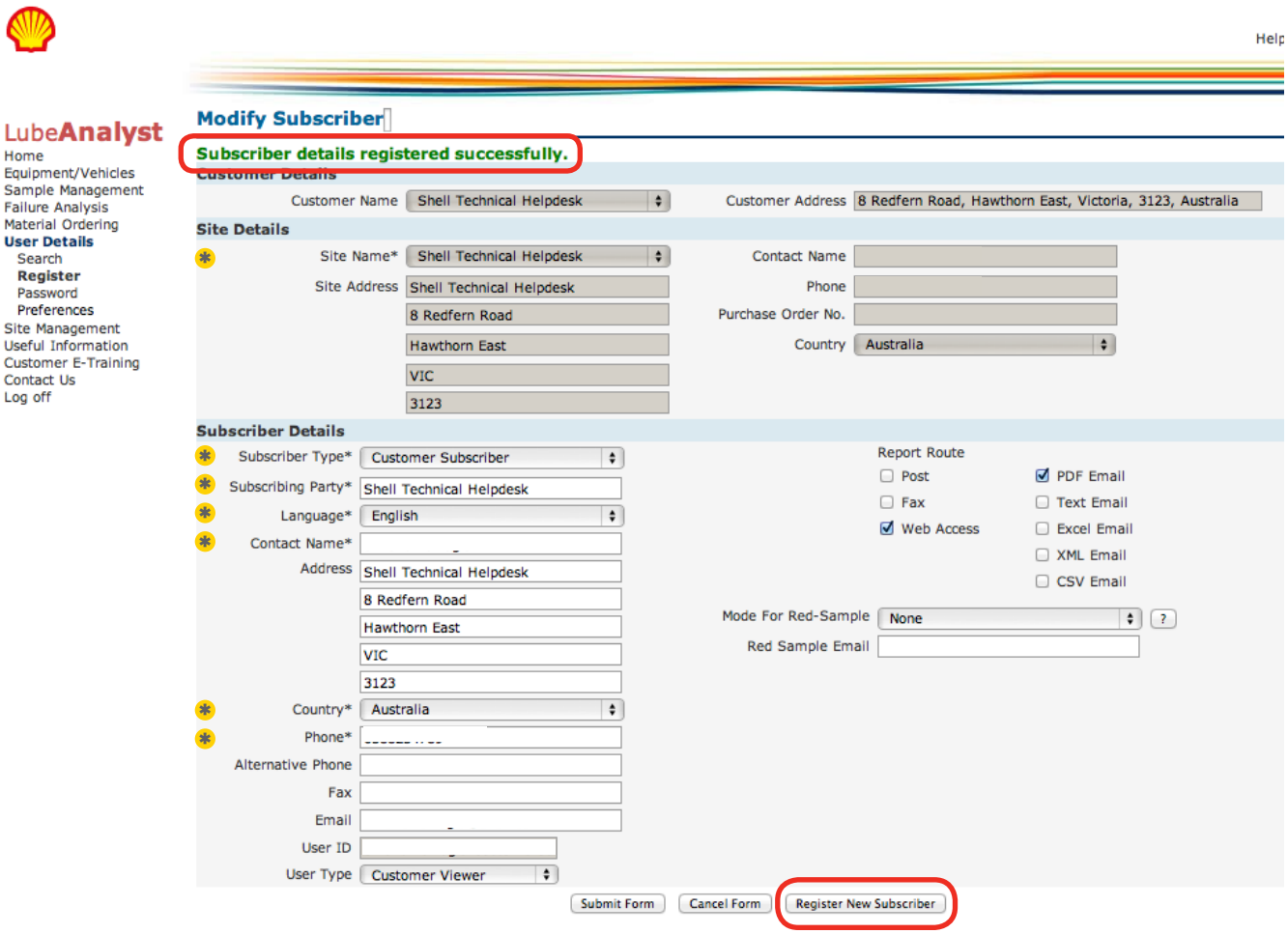


Figure 11 Modify Subscriber

Click Register New Subscriber if you would like to add another subscriber at this stage.

7.2 Registering a subscriber at Equipment/Component level

This section describes the process for registering a subscriber to a component or piece of equipment. As shown in **Table 1**, customer user or customer admin access is required to register a subscriber to a level lower than a site.

The first step to registering a subscriber to a piece of equipment or component is to locate the equipment or component. Select **Equipment/Vehicles** then **Search**, enter the selection criteria and click the Search button.

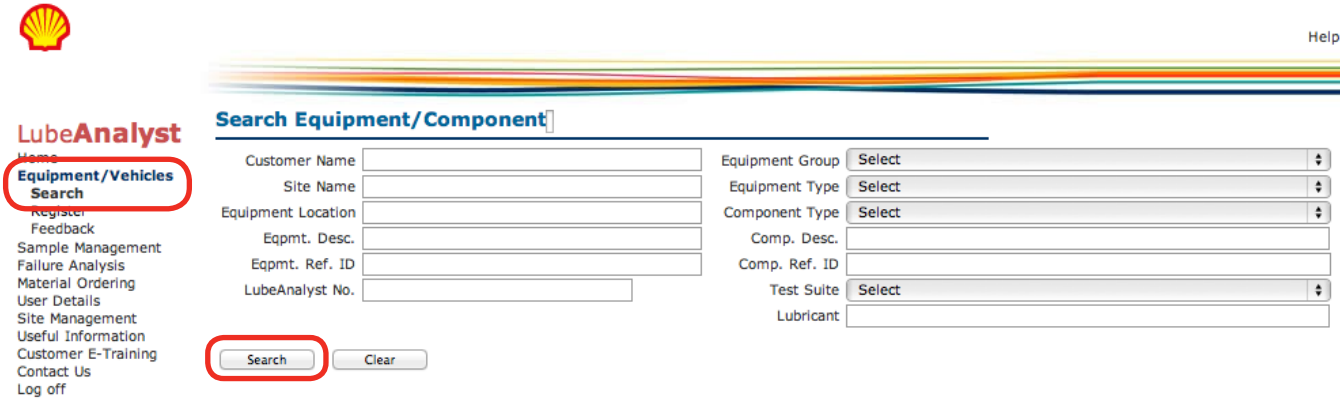


Figure 12 Search Equipment/Component – Search

A list of all registered equipment applicable to the criteria entered will be shown, from which you then need to select the specific piece of equipment or component. Note that if you wish to register the subscriber to multiple pieces of equipment or components you must repeat the process for each. Alternatively, you can register the subscriber to the site, which would result in the subscriber receiving Shell LubeAnalyst results for all the equipment and components registered to that site.

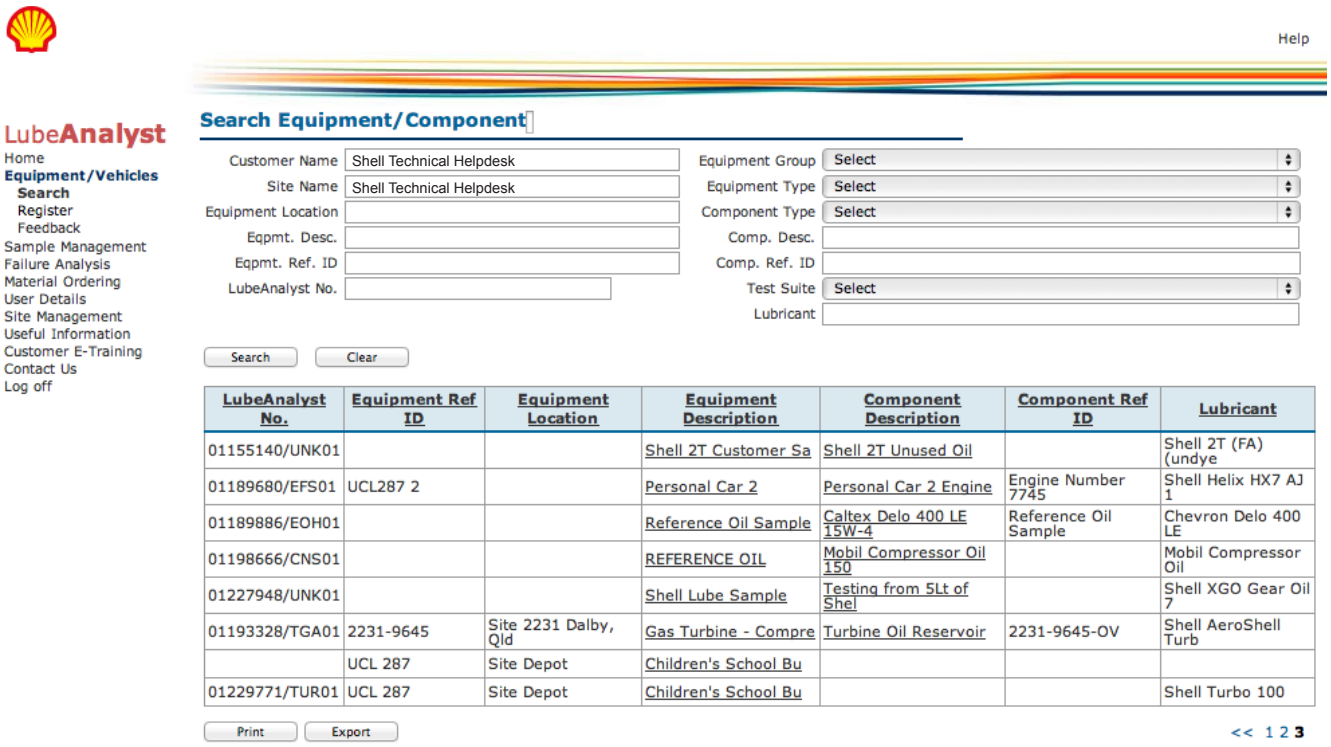


Figure 13 Search Equipment/Component – Listing

Select Modify Equipment if you wish to register the subscriber to the piece of equipment, or select Modify Component to register the subscriber at the component level.

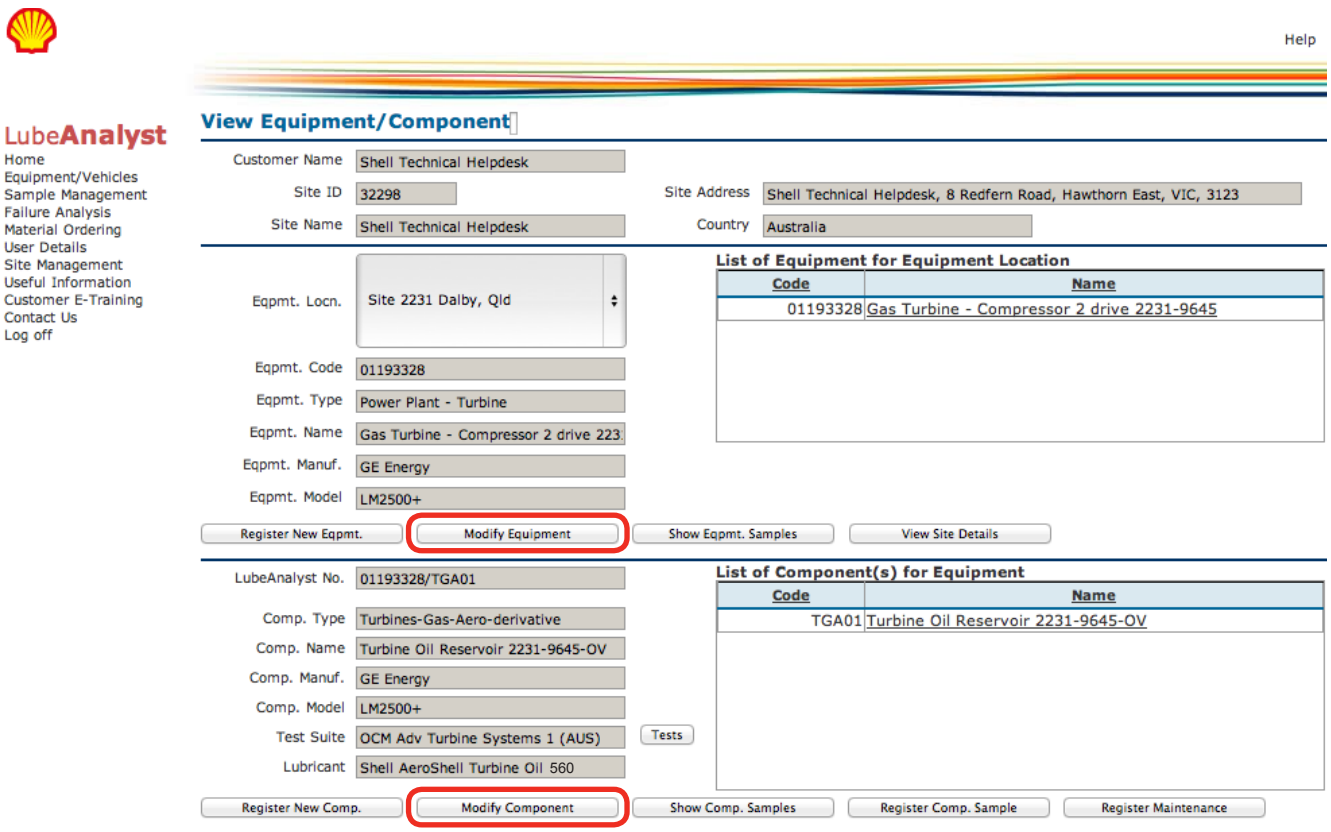


Figure 14 View Equipment/Component

From the **Modify Component** or **Modify Equipment** window select the Add button under the **Subscriber(s)** section.

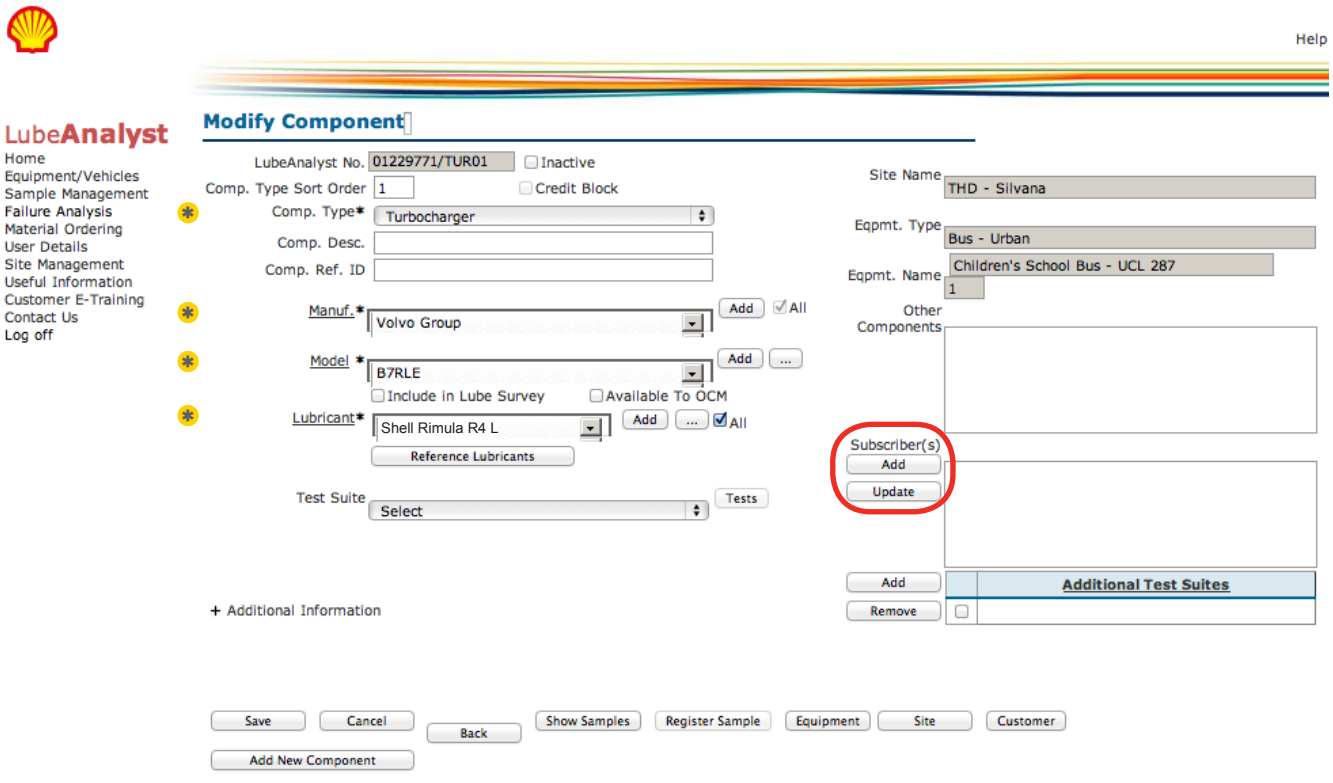


Figure 15 Modify Component/Equipment

The **Associated Subscribers** page will open in a new window, showing all the subscribers registered to that item. To add the new subscriber, select the Add New button. This will take you to the **Register Subscriber** screen.

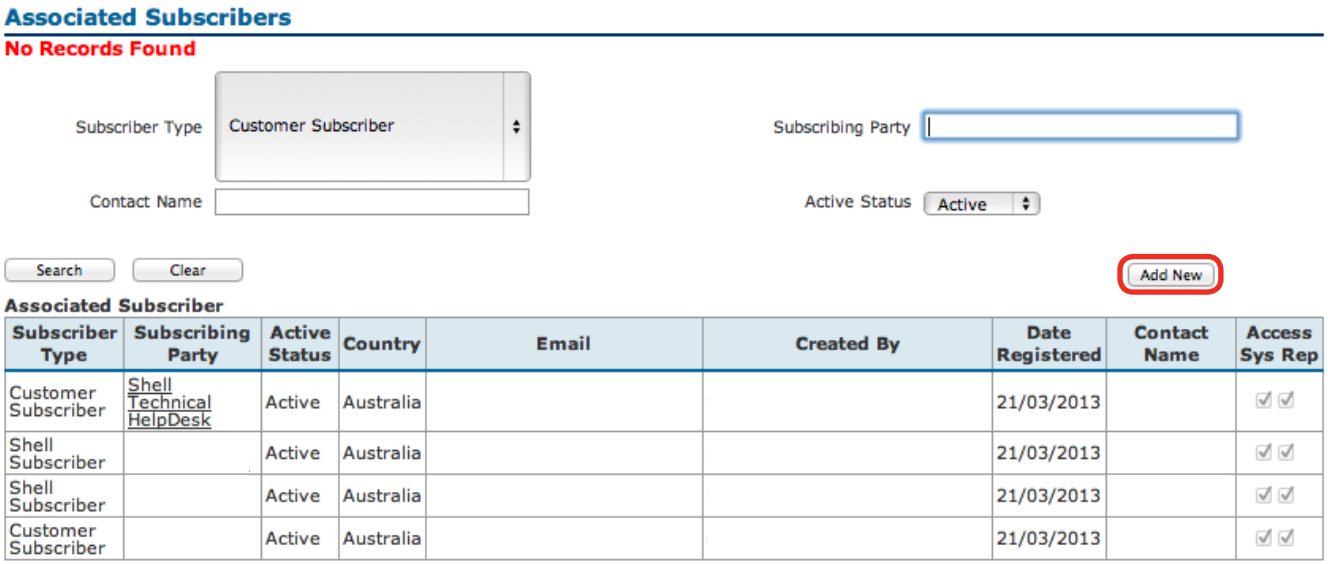


Figure 16.1 Associated Subscribers

In the **Register Subscriber** screen, enter all the new subscriber's details, as described in Section 7.1 Registering a subscriber at site level, and then click the Save button. A green message will appear confirming the **Successful registration of the subscriber**.

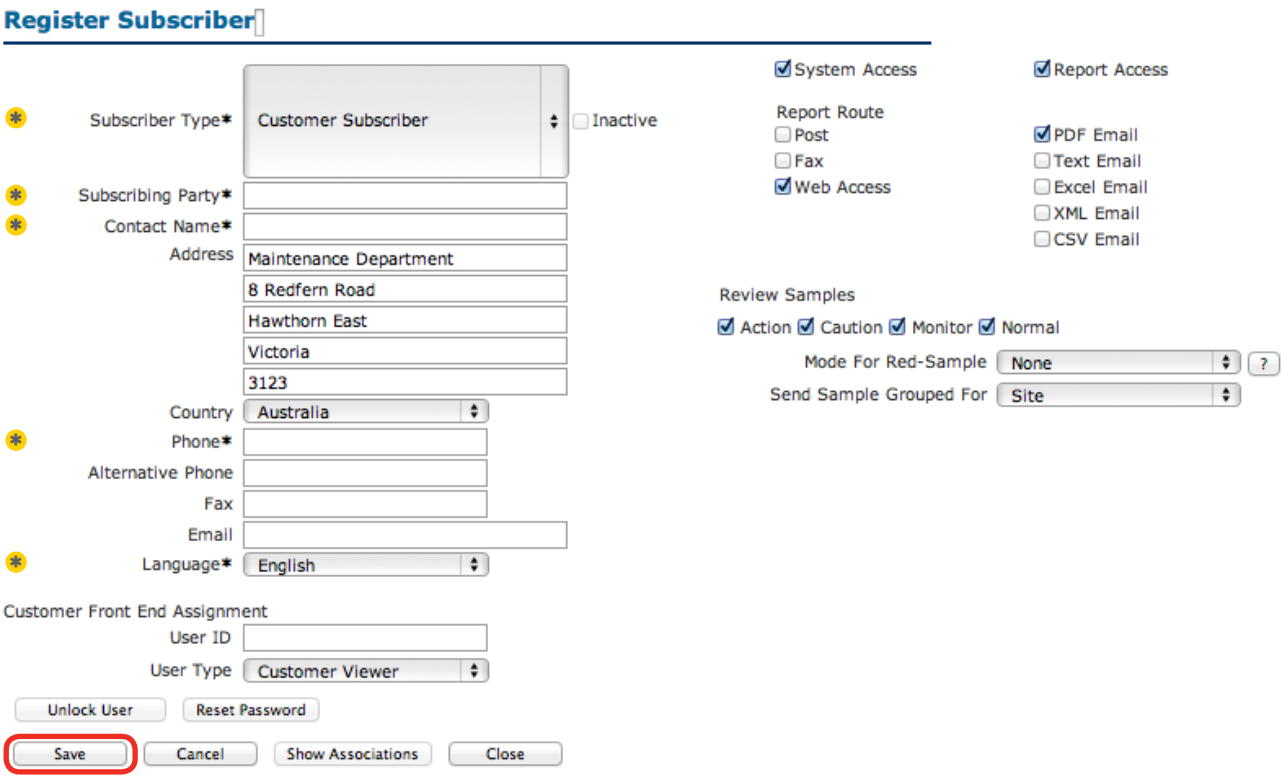


Figure 16.2 Register Subscriber

8 Ordering Shell LubeAnalyst Test Kits

Shell LubeAnalyst orders are processed by the Shell Technical Helpdesk. Purchase orders can be emailed to technical-au@shell.com or faxed to 1300 134 205. Please include the following information on your purchase order:

- Company Name
- Delivery Address
- Invoice Address
- Purchase Order Number
- Contact Name and Contact Details
- Type of kit required (refer to Section 9.0 Choosing a Shell LubeAnalyst Test Kit/Suite)
- Quantity of kits required

Shell LubeAnalyst materials are supplied as:

- Pre-paid test kits: LubeAnalyst "K1", "K2" and "K3" contain sampling materials for 10 samples. We send an invoice to you at the time the pre-paid kit is dispatched.
- Post-paid test kits: LubeAnalyst "Advanced", are ordered as individual samples. We send an invoice to you after the sample has been tested.

Your Shell LubeAnalyst samples are invoiced separately to lubricants and fuels orders.

For any issues relating to your LubeAnalyst invoice please contact the Shell Technical Helpdesk on 1300 134 205.

9 Choosing a Shell LubeAnalyst Test Kit/Suite

Shell LubeAnalyst offers two types of test suites: pre-paid test kits (LubeAnalyst K1, K2 and K3) and post-paid test kits (LubeAnalyst Advanced). The pre-paid test kits include a standard set of tests according to the sample source. Please review the following tables to help determine the correct test kit for your needs.

9.1 LubeAnalyst K1 Test Suites (Pre-Paid)

TEST SUITE	Viscosity @ 40°C (ASTM D445)	Viscosity @ 100°C (ASTM D445)	Flash Point (ASTM D3828)	Oxidation Index (FTIR JOAP)	Nitration Index (FTIR JOAP)	Moisture (%) (FTIR JOAP)	Soot Index (FTIR JOAP)	Spectrometry (ASTM D5185)	Lithium (Li) (ASTM D5185)	Sulphur (S) (ASTM D5185)
Air Compressor—ISO Grades	■			■		■		■		
Air Compressor—SAE Grades		■		■		■		■		
Automotive Transmission		■		■		■		■		
Aviation Engine—Diesel		■	■	■	■	■	■	■		
Aviation Petrol Engine		■	■	■	■	■		■		
Diesel Engines		■	■	■		■	■	■		
Diff/Final Drive/PTO—ISO Grades	■			■		■		■		
Diff/Final Drive/PTO—SAE Grades		■		■		■		■		
Hydraulic Systems—ISO Grades	■			■		■		■		
Hydraulic Systems—SAE Grades		■		■		■		■		
Industry Gears—ISO Grades	■			■		■		■	■	
Industry Gears—SAE Grades		■		■		■		■	■	
Industry—General—ISO Grades	■			■		■		■	■	
Locomotive Engine		■	■	■		■	■	■		
LPG/Natural Gas Engine		■		■	■	■		■		■
Marine Engines		■	■	■		■	■	■		
Petrol Engines		■	■	■	■	■		■		
Transport—General—SAE Grades		■	■	■		■	■	■		

9.2 LubeAnalyst K2 Test Suites (Pre-Paid)

TEST SUITE	Viscosity @ 40°C	Viscosity @ 100°C	Flash Point	TAN (ASTM D664)	TBN (ASTMD2896)	Water Content (KF)	Wear Index (PQ Index)	Oxidation Index (FTIR JOAP)	Nitration Index (FTIR JOAP)	Moisture (%) (FTIR JOAP)	Soot Index (FTIR JOAP)	Spectrometry (ASTM D5185)	Lithium (Li) (ASTM D5185)	Sulphur (S) (ASTM D5185)
Air Compressor—ISO Grades	■			■			■	■		■		■		
Air Compressor—SAE Grades		■		■			■	■		■		■		
Automotive Transmission		■					■	■		■		■		
Aviation Engine—Diesel		■	■		■		■	■	■	■	■	■		
Aviation Petrol Engine		■	■				■	■	■	■		■		
Diesel Engines		■	■		■		■	■		■		■		
Diff/Final Drive/PTO—ISO Grades	■						■	■		■	■	■		
Diff/Final Drive/PTO—SAE Grades		■					■	■		■		■		
Hydraulic Systems—ISO Grades	■						■	■		■		■		
Hydraulic Systems—SAE Grades		■					■	■		■		■		
Industry Gears—ISO Grades	■						■	■		■		■	■	
Industry Gears—SAE Grades		■					■	■		■		■	■	
Industry—General—ISO Grades	■			■			■	■		■		■		
Locomotive Engine		■	■		■		■	■		■	■	■		
LPG/Natural Gas Engine		■		■			■	■	■	■		■		■
Marine Engines		■	■		■		■	■		■	■	■		
Petrol Engines		■	■				■	■	■	■		■		
Refrigerator Compressor	■			■		■	■					■		
Transport—General—SAE Grades		■	■		■		■	■	■	■	■	■		
Turbines—Aviation Grades		■	■	■			■	■	■	■		■		
Turbines—ISO Grades	■			■		■	■					■		

9.3 LubeAnalyst K3 Test Suites (Pre-Paid)

TEST SUITE	Viscosity @ 40°C (ASTM D445)	Viscosity @ 100°C (ASTM D445)	Particle Count (ISO 4406:1999 New)	TAN (ASTMD664)	TBN (ASTMD2896)	Water Content (KF)	Wear Index (PQ Index)	Oxidation Index (FTIR JOAP)	Nitration Index (FTIR JOAP)	Soot Index (FTIR JOAP)	Spectrometry (ASTM D5185)	Lithium (Li) (ASTM D5185)
Air Compressor—ISO Grades	■		■	■		■	■	■			■	
Air Compressor—SAE Grades		■	■	■		■	■	■			■	
Diff/Final Drive/PTO—ISO Grades	■		■			■	■	■			■	
Diff/Final Drive/PTO—SAE Grades		■	■			■	■	■			■	
Hydraulic Systems—ISO Grades	■		■	■		■	■	■			■	
Hydraulic Systems—SAE Grades		■	■	■		■	■	■			■	
Industry Gears—ISO Grades	■		■	■		■	■	■			■	■
Industry Gears—SAE Grades		■	■	■		■	■	■			■	■
Industry—General—ISO Grades	■		■	■		■	■	■			■	■
Refrigerator Compressor	■		■	■		■	■				■	
Transport—General—SAE Grades		■	■		■	■	■	■	■	■	■	
Turbines—ISO Grades	■		■	■		■	■				■	
Turbines—Aviation Grades		■	■	■		■	■	■			■	

9.4 LubeAnalyst Advanced Turbines Test Suites (Post-Paid)

TEST SUITE	Air Release Characteristics	Analytical Ferrography	Anti Rusting (Fresh Water)	Appearance	Foam Seq 1, 2 & 3 (Tend/Stab)	Laser Net Fines	Millipore Sludges (0.8µ)	Particle Count (ISO 4406)	TAN (ASTM D664)	Viscosity 40°C	Water Content (KF)	Water Separability	Wear Index (PQ Index)	Oxidation Stability (RPVOT)	Spectrometry (ASTM D5185)	Particle Count (NAS)
Advanced Turbine Systems 1				■		■			■	■	■		■		■	■
Advanced Turbine Systems 2		■		■				■	■	■	■		■	■	■	
Advanced Turbine Systems 3	■	■		■	■		■	■	■	■	■		■	■	■	
Advanced Turbine Systems 4	■	■	■	■	■		■	■	■	■	■	■	■	■	■	

9.5 LubeAnalyst Advanced Test Suites (Post-Paid)

TEST SUITE	Analytical Ferrography	Appearance	Breakdown Voltage	Buchholz Gas Analysis	Conductivity	Flash Point	Particle Count	Oxidation Index	Glycol	Interfacial Tension	Laser Net Fines	Micro Organisms	Millipore Sludges	pH value	Reserve Alkalinity	Sulphur	Total Acid Number (TAN)	Viscosity 40°C	Water Content (KF)	Wear Index (PQ Index)	Nitrite	Spectrometry
Advanced Heat Transfer and Seal Systems		■				■							■				■	■	■			■
Advanced Air Compressor Systems		■					■	■					■				■	■	■	■		■
Advanced Bearing and Circulating Systems		■					■	■					■				■	■	■	■		■
Advanced Coolant Systems		■			■				■					■	■						■	■
Advanced Diesel Fuel						■						■				■		■	■			■
Advanced Ferrography	■																					
Advanced Fire Resist Hydraulic Fluid (HFD)		■															■	■	■			■
Advanced Gas Compressor Systems		■					■	■					■				■	■	■	■		■
Advanced Grease Lubricated Bearings		■																		■		■
Advanced Particle Shape Classifier							■				■											
Advanced Refrigeration Compressor Systems		■					■						■				■	■	■	■		■
Advanced Transformer Oil Quality		■	■							■							■		■			
Advanced Transformer Oil Quality+DGA		■	■	■						■							■		■			
Advanced Turbo Compressor Systems		■					■	■					■				■	■	■	■		■

10 Sample Techniques and Registration

Once you have purchased and received your test kits, you will be ready to take samples and send them to the Shell LubeAnalyst laboratory for analysis.

10.1 Best Practice Sampling Techniques

Most lubricant condition monitoring services use an oil sample of only 100mL to represent a system that may hold hundreds or thousands of litres of oil, so it is very important to take a representative sample. From the very first sample, you begin investing in a valuable condition monitoring programme. Every sample contributes to building a history from which trends in wear, contamination, and degradation can be determined. When sampling from systems, always observe environment, health and safety requirements. Take care with high-pressure piping and thermal systems and sampling close to electrical equipment or when sampling from a drain line. If in doubt, please contact your Lubricants Technical Advisor or Shell Technical Helpdesk.

We recommend a consistent method of taking a sample. Always take the sample at the same point, in the same way and after the same amount of time. For example, if you previously took the sample half an hour after the machine has been started, please make sure that the next sample is taken half an hour after the start of the machine as well. We recommend that you sample a component while it is running (if it is safe to do so) or within 30 minutes after shutdown. Refrain from sampling right after a large volume of lubricant has been added. Always be sure to draw sufficient sample to fill the bottle. 80% full is a good level to aim for, as this will help ensure that there is adequate sample to complete all tests, and will ensure adequate ullage to allow sample agitation by the laboratory.

Areas where lubricant flow is restricted or where contaminants and wear products tend to settle and collect should be avoided as sampling points. Always try to take the sample in the most hygienic of conditions. This will help to minimise contaminants in the sample, which could lead to an incorrect analysis and diagnosis. Use the correct sampling equipment and the bottles supplied by Shell. Make sure that they are unopened, unused and clean before you use them. Always clean the sampling gun immediately after use. After taking the samples, check to make sure that the bottle lids are tightly closed.

The optimum location to sample a circulating system is a live zone upstream of filters where contaminants and wear debris are the most concentrated. Usually, this means sampling from fluid return lines or drain lines. For systems where oil drains back to a sump without being directed through a line (such as engines), draw from the pressure line down-stream of the pump (before the filter). Permanent sampling points should be at elbows in pipe runs in preference to straight sections. This will help to ensure that the flow regime at the sample point is turbulent and that wear and contaminant particles do not ‘drop out’ of suspension.

Avoid sampling from dead zones of static tanks and reservoirs. In particular, sampling from the bottoms of sumps should be avoided because the wear debris and contaminants collected are likely to be the results of build up over time and may not represent current operating conditions. The sample point should be near the mid-point between the surface of the oil and the floor of the tank/sump and away from walls.

Splash, slinger-ring and flood-lubricated components are best sampled from drain plugs but only after considerable flushing. In a similar manner, permanent valves should be wiped clean and then flushed prior to sampling to ensure that any ‘dead-leg’ debris is excluded from the sample.

10.2 Drawing a sample with a sample pump

1. Use a Shell LubeAnalyst sample bottle, remove the cap and screw into the pump body.
2. Using a new length of tube for each sample, push the tube through the top of the pump until it appears half way down the sample bottle. Please make sure to tighten the thumbscrew to secure the tube.
3. Place the end of the tube into the sampling point.
4. Make sure that the sample bottle is vertical throughout the sampling operation and that it is not overfilled. It is also important that the gun and bottle assembly is kept upright while in use to prevent oil entering the gun. Should this occur, disassemble it immediately and flush thoroughly with a solvent such as white spirit, Shellite or X55. Dry before reassembling. DO NOT FLUSH GUN WITH PETROL OR DEGREASING FLUID.
5. Complete the sample label and attach to the bottle. Place the bottle inside the plastic bag provided and close the ziploc then slip the bottle into the mailing canister. Send the sample to the laboratory by affixing the mailing label to the canister and dropping in the post, or use a pre-paid courier bag (available to purchase when you order your LubeAnalyst kits).

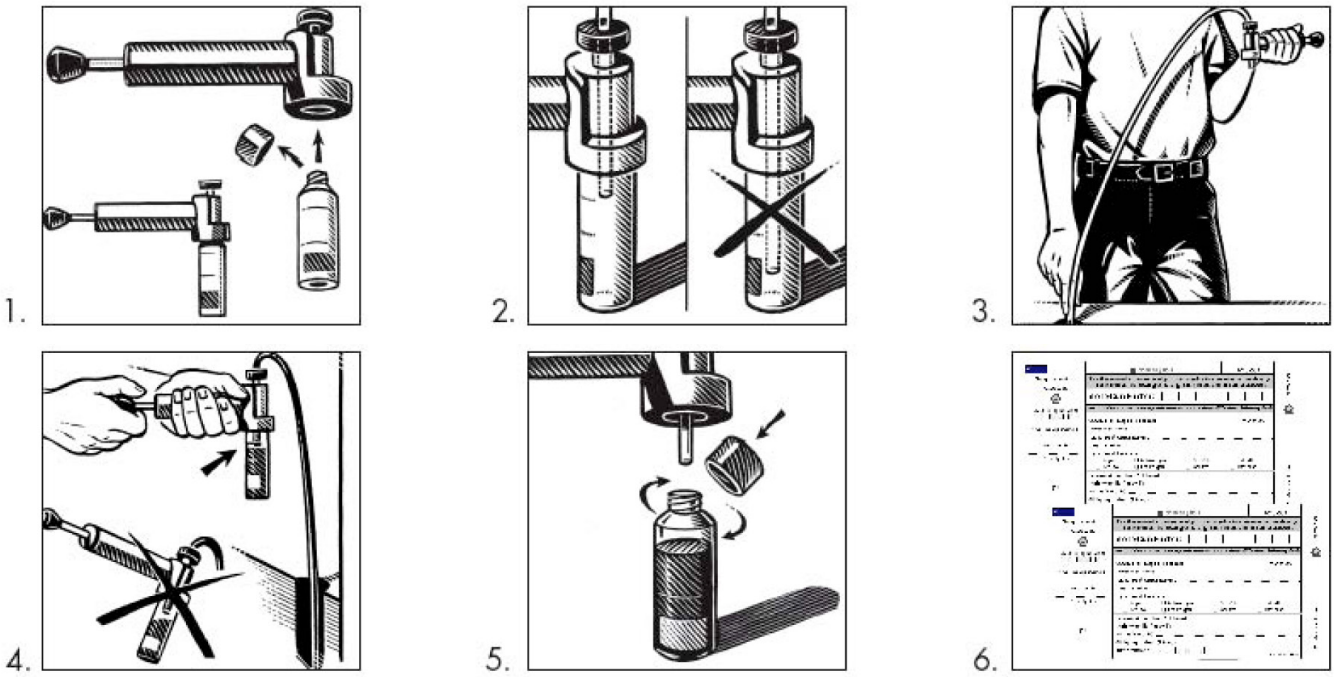


Figure 17 Taking a good sample

10.3 Completing a Shell LubeAnalyst Sample Label

The LubeAnalyst label is divided into four sections:

A) Customer record stub – complete and keep this for your records

B) Sample identification tabs – stick these onto the sample bottle and lid

C) Sample specific information – complete this to identify your sample

D) Site, Equipment and Component information – complete this if not already registered in LubeAnalyst (or register online)

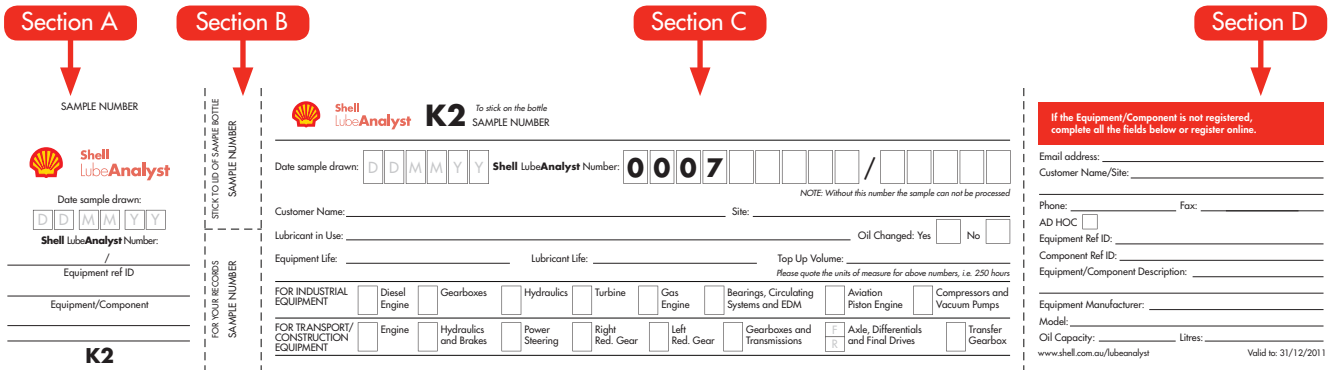


Figure 18 Shell LubeAnalyst Sample Label

1. First time samples (without registering online with Shell LubeAnalyst):
   For a first time sample, complete all sections with the required information. As it is the first sample, a Shell LubeAnalyst Number will not yet be assigned to the component. This Shell LubeAnalyst Number is unique to each component and is left blank for first-time samples. It will be assigned once the first sample has been registered in Shell LubeAnalyst and will appear on the LubeAnalyst sample report. You can then record on future samples.

2. Registering the sample online:
   Registering the sample online is the most efficient way of recording the required data. The next section, Section 10.4, describes the process of registering a sample online. Once you've registered online, just record the Shell LubeAnalyst number in Section C.

3. Ongoing samples:
   Complete Sections A, B and C. In Section C, fill in the Shell LubeAnalyst Number, Equipment Life, Lubricant Life, Top-Up Volume and tick if the oil was changed.

If you have any questions about the information required, please contact your Shell Account Manager, Lubricants Technical Advisor or the Shell Technical Helpdesk.

10.4 Registering a new sample with Shell LubeAnalyst

Now that the sample label has been filled in with all the required information, the sample can be registered on the LubeAnalyst system. Select **Sample Management**, then **Register** from the LubeAnalyst menu.

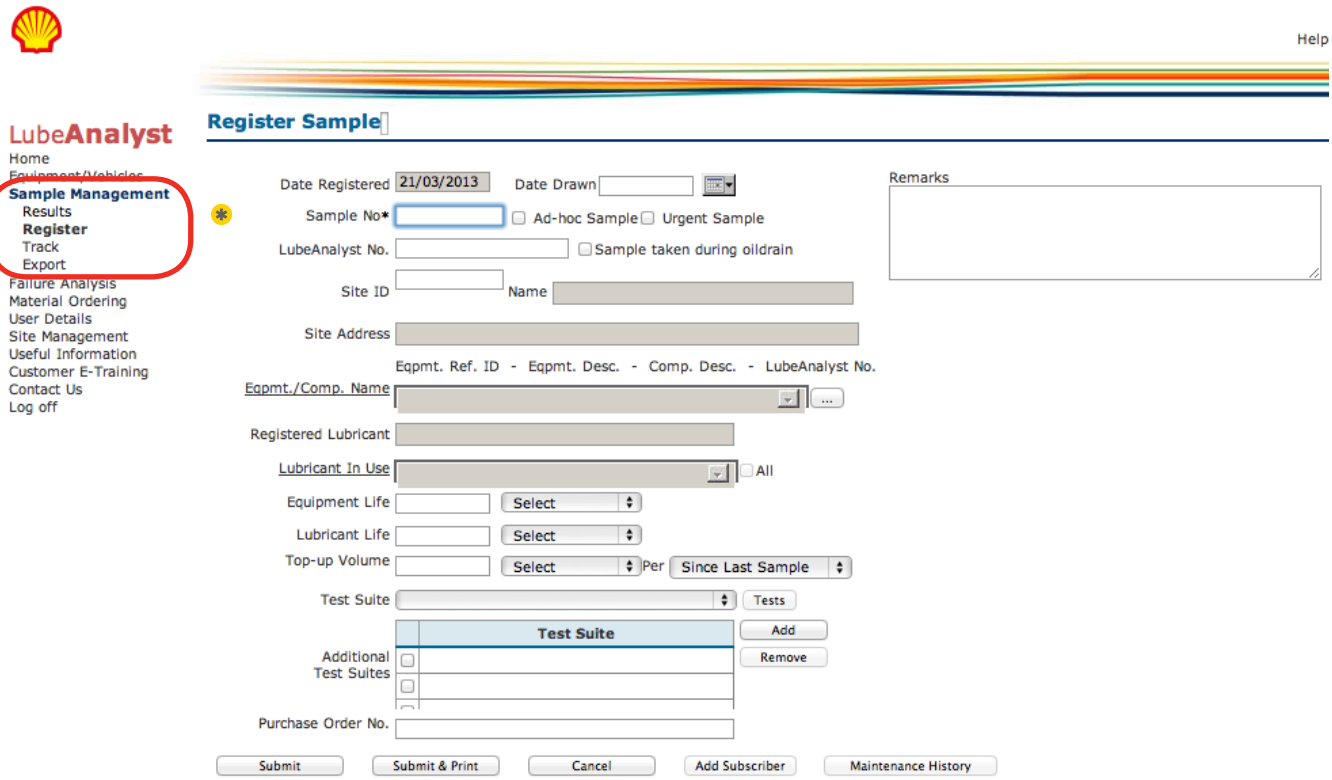


Figure 19 Register Sample

Complete the fields on the **Register Sample** page. If registering a sample for a component that has previously been sampled, you can input the LubeAnalyst number that appears on the top of the historical analysis report. This will automatically complete all standard fields, requiring only Equipment Life, Lubricant Life and Top-Up Volume to be completed.

If it is the first sample to be taken from the component being sampled, then the registered equipment and component can be located by either inputting the Site ID and selecting it from the drop down Eqpmt./Comp. box, or by searching for it by clicking the ... button.

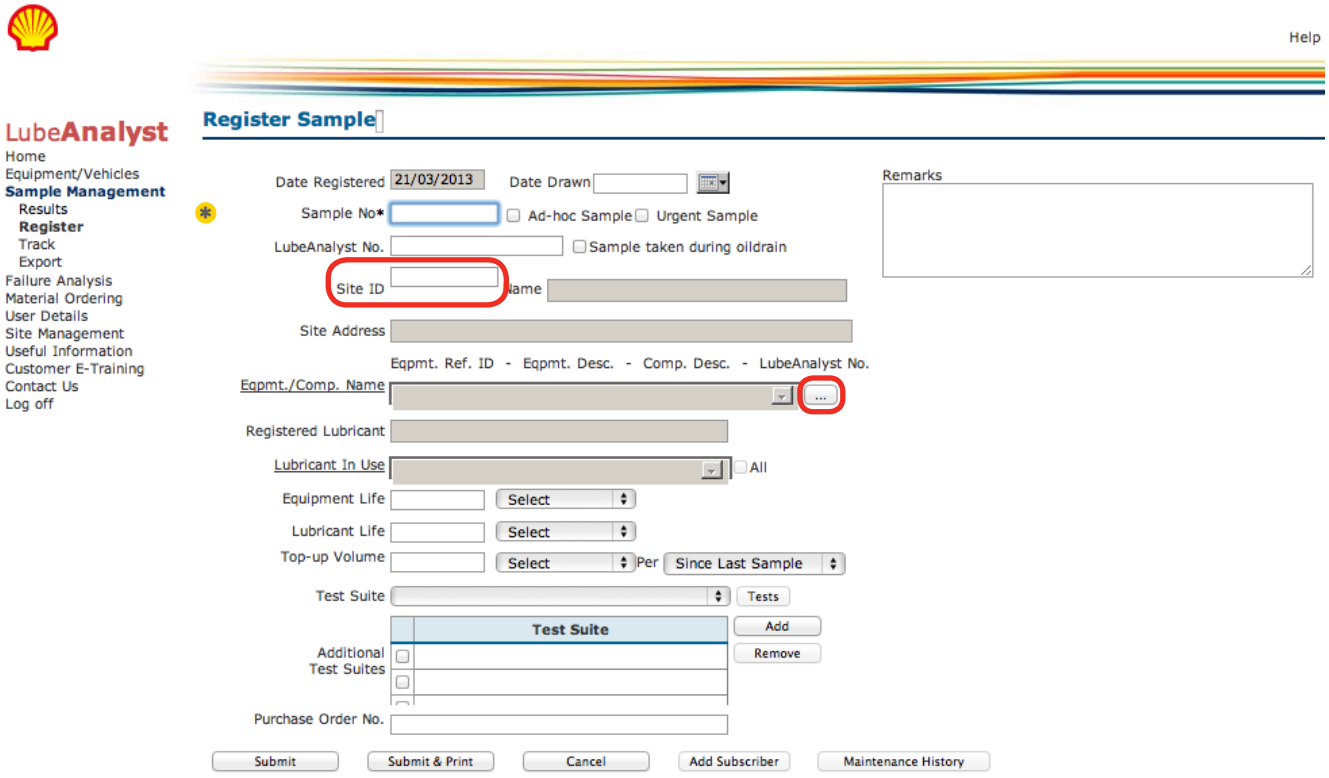


Figure 20 Locating Registered Equipment/Component

Once all fields have been completed click the Submit button. A green message will appear confirming the sample **Data Saved Successfully**.

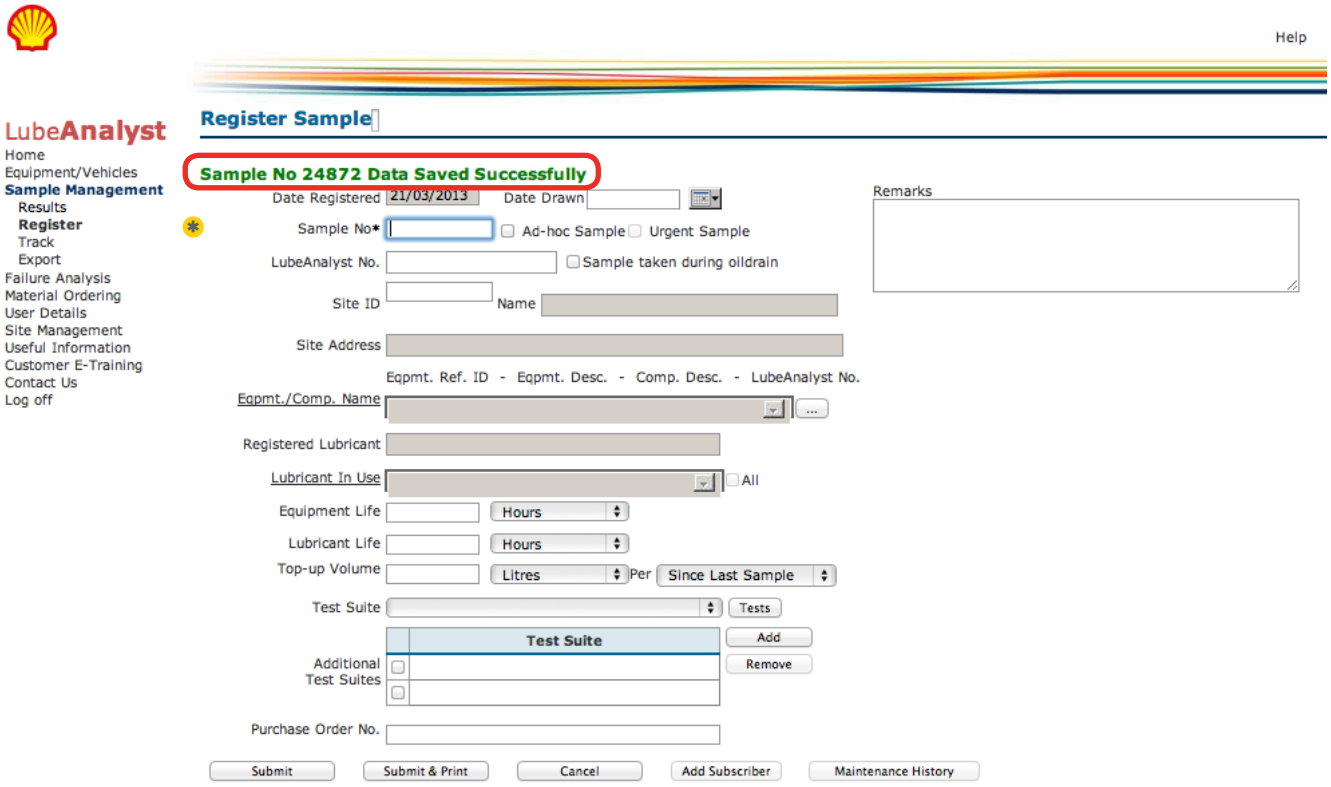


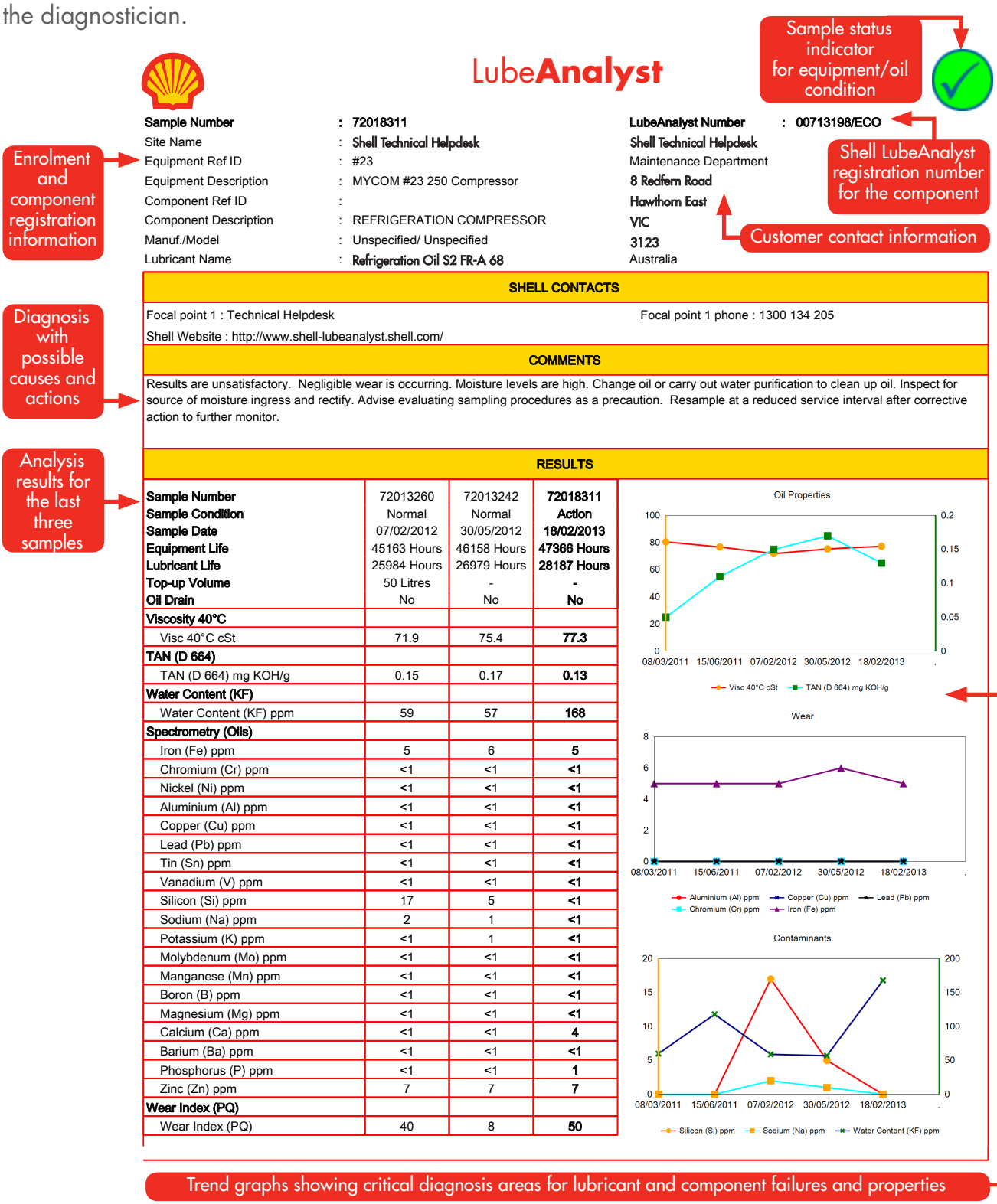
Figure 21 Save Sample Registration

11 Shell LubeAnalyst Sample Analysis Reports

The sample reports will detail a diagnosis, the sample status Action (Red), Caution (Amber), Monitor (Yellow) and Normal (Green), as well as test results. Reports include graphical output showing key diagnosis areas such as wear metals and viscosity (note that two or more samples per component are required for trending).

11.1 Shell LubeAnalyst K1, K2 and K3 Test Suite Reports

The report is contained on one page and shows the last three sample results for oil properties, wear metals and contamination. It also includes comments and recommendations from the diagnostician.



Sample Number	:	**72018311**
Site Name	:	**Shell Technical Helpdesk**
Equipment Ref ID	:	#23
Equipment Description	:	MYCOM #23 250 Compressor
Component Ref ID	:	
Component Description	:	REFRIGERATION COMPRESSOR
Manuf./Model	:	Unspecified/ Unspecified
Lubricant Name	:	**Refrigeration Oil S2 FR-A 68**

LubeAnalyst Number	:	**00713198/ECO**
Shell Technical Helpdesk		
Maintenance Department		
8 Redfern Road		
Hawthorn East		
VIC		
3123		
Australia		

SHELL CONTACTS

Focal point 1 : Technical Helpdesk — Focal point 1 phone : 1300 134 205

Shell Website : http://www.shell-lubeanalyst.shell.com/

COMMENTS

Results are unsatisfactory. Negligible wear is occurring. Moisture levels are high. Change oil or carry out water purification to clean up oil. Inspect for source of moisture ingress and rectify. Advise evaluating sampling procedures as a precaution. Resample at a reduced service interval after corrective action to further monitor.

RESULTS

Sample Number	72013260	72013242	**72018311**
Sample Condition	Normal	Normal	**Action**
Sample Date	07/02/2012	30/05/2012	**18/02/2013**
Equipment Life	45163 Hours	46158 Hours	**47366 Hours**
Lubricant Life	25984 Hours	26979 Hours	**28187 Hours**
Top-up Volume	50 Litres	-	**-**
Oil Drain	No	No	**No**
Viscosity 40°C			
Visc 40°C cSt	71.9	75.4	**77.3**
TAN (D 664)			
TAN (D 664) mg KOH/g	0.15	0.17	**0.13**
Water Content (KF)			
Water Content (KF) ppm	59	57	**168**
Spectrometry (Oils)			
Iron (Fe) ppm	5	6	**5**
Chromium (Cr) ppm	<1	<1	**<1**
Nickel (Ni) ppm	<1	<1	**<1**
Aluminium (Al) ppm	<1	<1	**<1**
Copper (Cu) ppm	<1	<1	**<1**
Lead (Pb) ppm	<1	<1	**<1**
Tin (Sn) ppm	<1	<1	**<1**
Vanadium (V) ppm	<1	<1	**<1**
Silicon (Si) ppm	17	5	**<1**
Sodium (Na) ppm	2	1	**<1**
Potassium (K) ppm	<1	1	**<1**
Molybdenum (Mo) ppm	<1	<1	**<1**
Manganese (Mn) ppm	<1	<1	**<1**
Boron (B) ppm	<1	<1	**<1**
Magnesium (Mg) ppm	<1	<1	**<1**
Calcium (Ca) ppm	<1	<1	**4**
Barium (Ba) ppm	<1	<1	**<1**
Phosphorus (P) ppm	<1	<1	**1**
Zinc (Zn) ppm	7	7	**7**
Wear Index (PQ)			
Wear Index (PQ)	40	8	**50**

Figure 22 LubeAnalyst K1, K2 and K3 Test Suite Report

11.2 Shell LubeAnalyst Advanced Test Suite Reports

The Advanced Report is detailed over two pages. The first page shows comments and recommendations from the diagnostician, plus graphs on oil properties, wear metals, contamination and additives. The second page includes test results for the last six samples.

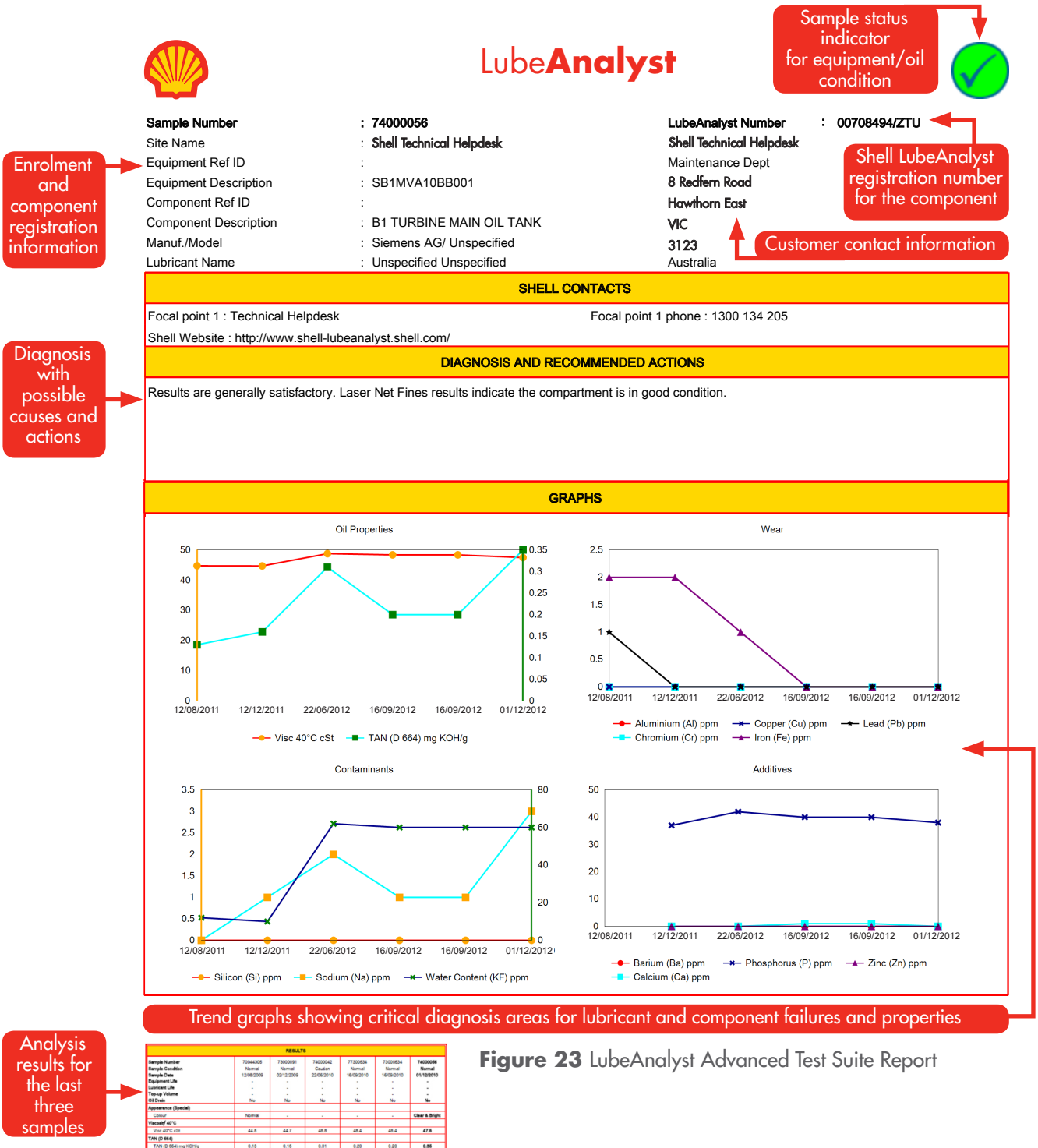


Figure 23 LubeAnalyst Advanced Test Suite Report

Analysis results for the last three samples

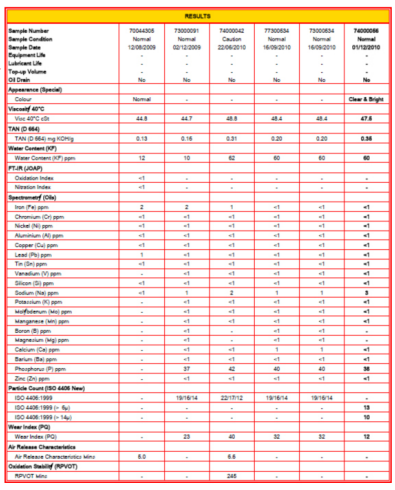


Figure 24 Analysis Results

11.3 Shell LubeAnalyst Failure Analysis Feature

Shell LubeAnalyst's unique failure analysis tool allows for an overview of your equipment condition monitoring programme, indicating the number of samples and percentage categorised as Action (Red), Caution (Amber), Monitor (Yellow) and Normal (Green). Further analysis can also categorise all the Action (Red), Caution (Amber), Monitor (Yellow) by failure type. These failure types can indicate the underlying reasons why the sample was diagnosed with that condition. This helps the user to identify the areas for greatest improvement, and can also be used to monitor reliability of site equipment.

Select **Failure Analysis** from the LubeAnalyst menu and manipulate the filters.

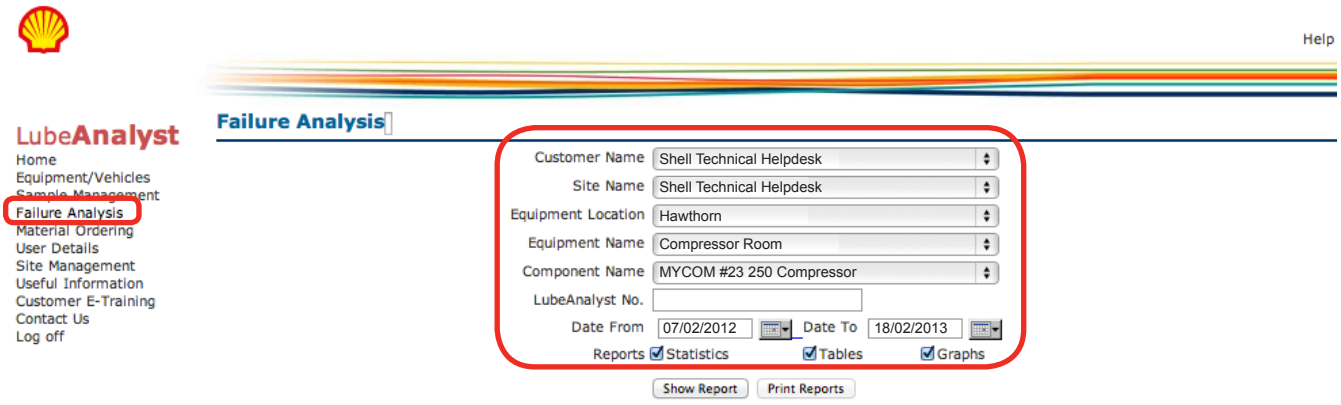


Figure 25 Failure Analysis

There are three options for reports: Statistics, Tables and Graphs. Select your desired type and click the Show Report button to show the report in the LubeAnalyst website or the Print Reports button to generate a PDF report.

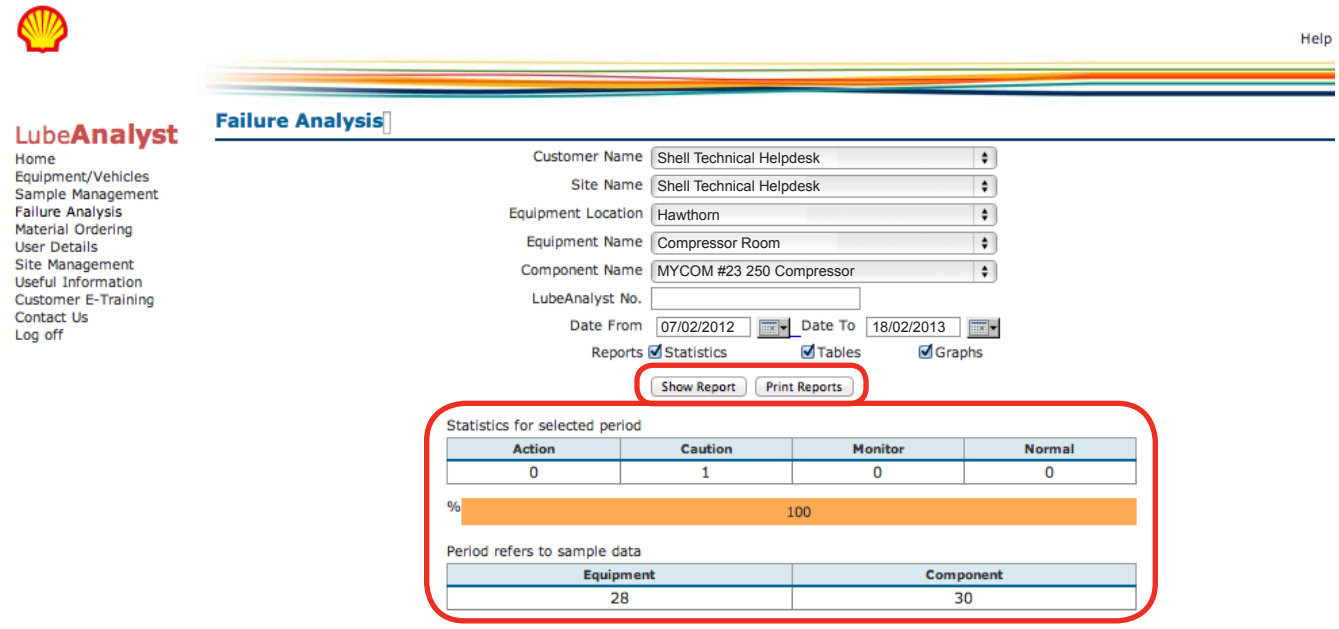


Figure 26 Show Report

12 Key Contacts and More Information

For more information, please contact your Shell Account Manager, Shell Lubricants Distributor or Reseller, Shell Lubricants Technical Advisor or the Shell Technical Helpdesk on 1300 134 209.

www.shell.com.au/lubeanalyst